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TREATMENT OF CHRONIC DACRYOCYSTITIS

W. L. BENEDICT, M.D., AND R. A. BARLOW, M. D.

ROCHESTER, MINN.

This paper prepared by cooperation of the Sections on Ophthalmology and on Otolaryngology and Rhinology of the Mayo Clinic includes a general discussion of the subject and the description of a preferred method of operation.

Inflammation of the lacrimal sac may be said to have become chronic when the function of the drainage apparatus cannot be restored by the use of medical or hygienic measures, and operative procedures have to be employed either to restore the function of the duct or to remove the sac and obliterate the duct. Malformation of the puncta, eversion of the lids, simple stenosis of the duct, or obstruction of the lacrimal meatus in the nose, may be responsible for epiphora at any age, without inflammation of the sac, while acute or chronic inflammation may arise without complete closure of either end of the drainage system.

Stenosis of the duct in infants seldom results in suppurative affection of the sac but may often cause collections of large amounts of secretion that distend the sac, producing a mucocele and often a permanent fistula through the skin. Such a mucocele may extend backward, involving a part of the ethmoid labyrinth, or even extend into the orbit. Obstruction in children may follow edema and secondary inflammation of the duct from syphilitic periostitis, without other obstruction. The lacrimal sac in such cases may become secondarily infected and produce a purulent secretion. The sac is quite troublesome and difficult to heal except by vigorous antiluetic treatment.

If we may draw a conclusion from the comparative occurrence of purulent discharge in cases of obstruction of the lacrimal system we may say that

chronic suppurative dacryocystitis in children is more often the result of disease of the structures about the lacrimal duct and sac than of congenital or acquired anatomic obstruction to the patency of the system.

The proportion of suppurative conditions of the sac in the adult is reversed. Obstruction to the flow of tears follows atresia of the puncta, eversion of the lids, or intranasal blocking. With the latter cause the closure of the canal is usually found in the duct at the point of least diameter, 10 mm. to 15 mm. below the upper end of the duct proper. Rarely we may find the entire duct occluded and contracted to a small fibrous cord. The secretion collecting in the sac regurgitates into the conjunctival culdesac, or it can be thus emptied by external pressure. Occasionally the obstruction may be in the canaliculi, and the collected secretion expressed through a stenosed duct or artificial opening into the nose. Both the upper and the lower openings may be closed, leaving a blind pouch which becomes an immense mucocele or which may rupture externally, producing a permanent fistula.

The treatment of chronic dacryocystitis is ultimately surgical. The procedure to be employed will depend on the nature and position of the obstruction, the extent of the involvement of contiguous structures, and the changes in the tissues produced by the disease or by previous treatment. The inflammation may be of low grade, producing

a mucopurulent discharge without redness, pain, or heat, showing only a moderate and varying swelling and loss of function. Atony of the muscles of the lid and the muscle of Horner may fail to empty the sac completely and a passive dilatation of the sac results. The contents may be expressed easily.

Collection of secretion purulent or nonpurulent will, if rapidly produced, set up signs of active inflammation which gives rise to acute exacerbations. Removal of obstruction to the intranasal portion of the duct and careful use of small probes will be sufficient in many instances to reestablish patency of the duct. Further attention, such as irrigations and local application of antiseptic and astringent lotions, may be employed until the lining of the duct is in a more nearly normal condition. If the inflammation has existed for a long time, if there have been frequent attacks of acute inflammation, or if a quiet dacryocystitis has been unsuccessfully treated by the use of large probes, such simple measures as would be given to the lower end of the sac with the use of small probes will not insure a permanent opening, and it will be necessary to employ more radical measures.

Primary disease of the sac, that is from foreign material having become lodged in the sac or duct, producing stenosis and permitting secondary infection, may become so extensive as to occlude the entire duct and set up a periostitis and disease of the contiguous accessory sinuses. This is seen frequently in cases of traumatism of the nose and orbit from a kick in the face by a horse, or other accident, in which the head has suffered a crushing injury. On attempting to sound such a duct the sounding instrument will encounter bare bone, loose pieces may be felt to move, and the instrument may be passed beyond the lacrimal fossa into the opened cells of the accessory sinuses, and even into the nasal cavity beneath the nasal mucosa. If the nasal mucosa is also broken the secretion may empty directly into the nose. That this does not always fol-

low is sufficient evidence that operative procedures intended to produce such and only such an opening are inadequate, whether the opening is made with a probe, a trephine, or a chisel.

Secondary disease of the sac may follow disease of the accessory sinuses. We have been slow to recognize the importance of this fact because of the difficulty of diagnosing disease of the anterior ethmoid cells. Little evidence of ethmoid disease may be found by inspection of the nasal chambers at the time of examination. The nose may appear negative, yet in such cases we frequently have demonstrated mucopurulent secretion with destruction of the lining of the cells, when we have made an external opening for extirpation of the sac. Inflammations of this nature are, of course, quiescent; they may exist for years without giving sufficient evidence of disorder to warrant exenteration. Drainage is established through or around the sac, and the mucopurulent secretion is expressed into the conjunctival culdesac. Most of the secretion comes from the changed mucosa of the sac itself, and removal of the sac may close the drainage and so cover the evidence of ethmoid disease. Occasionally, however, a permanent fistula may be established thru the skin, thru which the mucopurulent secretion of the diseased ethmoid cells escapes.

A suppurative ethmoid may, by its close relation to the lacrimal groove, set up an inflammatory process in the duct or sac which sooner or later may become purulent. The ethmoiditis may be of very low grade, and give no intranasal manifestation of its presence, but in time the presence of the pus may cause inflammatory reaction in the lacrimal duct which in turn may lead to stenosis, predisposing to a suppurative condition in the sac.

Pus may find its way into the lacrimal duct through the meatus, where there is a suppurative sinusitis with free drainage into the nose. Under such conditions the patient in blowing the nose forces the pus into the duct. Simple extirpation of the sac does not re-

move the evidence of chronic dacryocystitis in such cases. We admit the truth of the statement so frequently made, that if all the sac is removed the discharge will stop, but we are referring to the cases in which healing does not take place when the sac is totally destroyed or removed.

To dispose of the troublesome and dangerous secretion in chronic dacryocystitis is the high aim of treatment. If at the same time the function of the duct

an operation no more difficult to perform than that of extirpation of the sac.

As has been mentioned, function may be restored in some cases by removal of low nasal obstruction and the careful use of small probes. The use of large probes, however, should be avoided in all cases. If a canal or bony foramen needs to be enlarged, it should be done by an open method, using cutting bone instruments, and not blindly

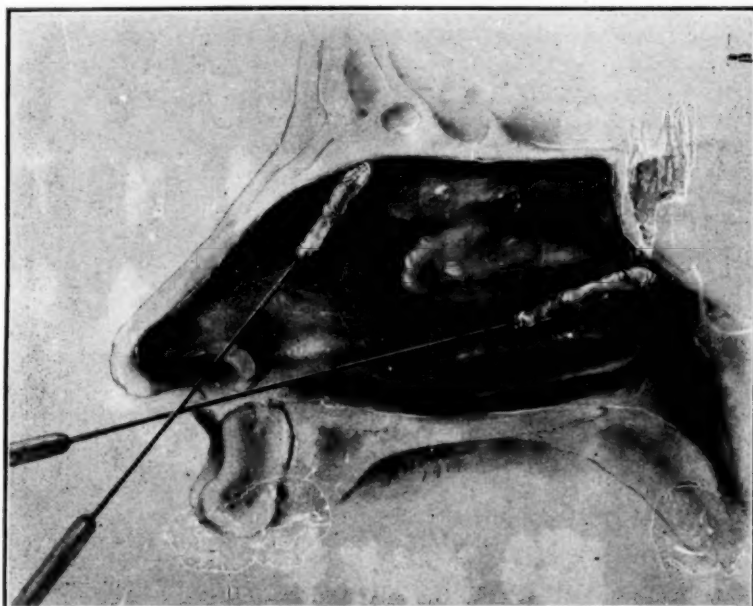


Fig. 1. Showing method of applying cocain mud with adrenalin to sphenopalatine ganglion and anterior ethmoidal nerve, giving complete anesthesia.

can be restored a double aim will have been accomplished. To this end various operations have been devised, but insufficient consideration has been given the changes which must be made in the tissues involved, for after all either the offending part is removed completely, or the elements are so rearranged that nature will not be impeded in providing protection for healthy organs and other tissues. To remove or to destroy a sac is to admit inability to cope with the disease of the tissues involved. The function of a stenosed and diseased lacrimal sac can often be restored by

by forcefully probing, crushing and tearing tissues that cannot be seen, and are only indefinitely felt. To attempt the treatment of chronic dacryocystitis by use of large probes either to enlarge the duct or to make an artificial opening into the nasal chamber is unwarranted and unjustified by the results obtained. If false passages are made into the antrum or soft tissues of the cheek, troublesome complications may follow. The use of metal styles is happily on the decline but they are now encountered sufficiently often to warrant mentioning the dangers accom-

panying their use and to urge better surgical methods of securing the same result.

Destruction of the sac by actual or potential cautery accomplishes only one thing, it stops the secretion from the tissues destroyed. It does not allow inspection of the tissues surrounding the sac either from within or without. It does not aid in reconstruction. No attempt is made to restore function to the sac. It is as difficult to destroy the

cessory cells and pieces of loose or necrotic bone. If any opening is found it should be enlarged, and the cavity from which it leads explored and cleaned. If only one or two cells can be found to be involved, and the disease is not then giving rise to a purulent discharge the whole cavity may be irrigated with 1:2000 bichlorid of mercury solution, and the wound closed in the usual manner without drainage. If the bone is necrotic or if pus is present in the

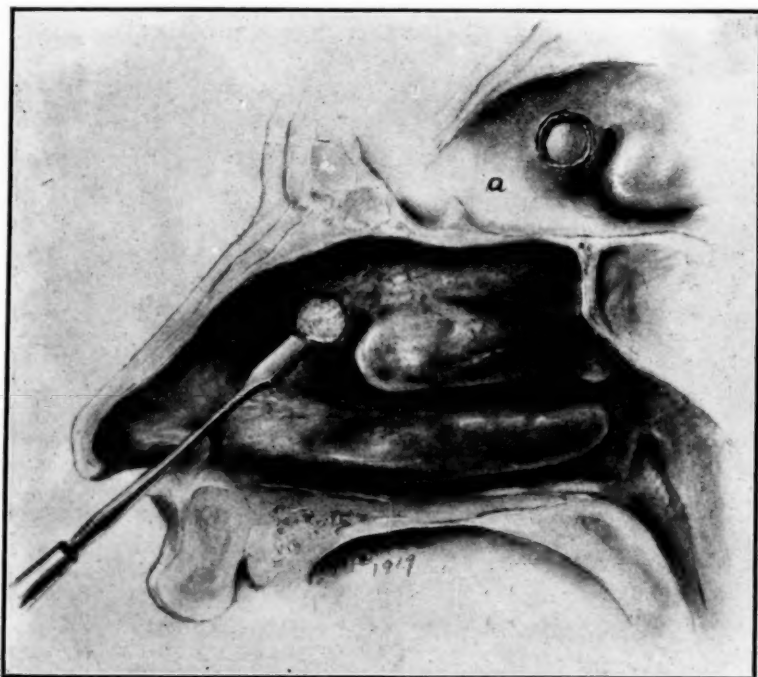


Fig. 2. Mucous membrane flap removed, exposing bone ready to be chiseled. a. Bone removed, exposing nasal wall of lacrimal duct and sac.

sac by cautery with good cosmetic effect as it is to extirpate the sac, and the latter procedure has the added advantage of allowing inspection of the fossa and the bony duct, leaving nothing to be desired from the cosmetic standpoint.

Extirpation of the sac after the method of Meller gives most satisfactory results in most cases. After the sac has been removed a sound should be passed along the entire bony surface of the fossa and upper part of the duct in a search for openings into ac-

ethmoid cells the loose bone should be removed, the diseased cells broken down, and an opening made through the nasal mucosa. The external wound may then be closed and the ethmoid disease treated from within the nose.

Operations for the restoration of function of the sac and duct, as well as the cleaning out of any diseased ethmoid cells, are advocated from time to time and have more to be said in their favor than any other form of treatment of chronic dacryocystitis. We are convinced that it is not neces-

sary in the majority of cases to do a radical operation from the external surface. Plastic operations intended to restore function are unnecessary, be-

cells and take care of any other intranasal obstruction.

If a sound can be passed through the sac and into the upper part of the duct



Fig. 3. Probe inserted thru inferior punctum, extending it into the sac; and tenting it thru window opening into the nose.

sides being difficult to perform and involving a great deal of after treatment. When the sac and upper portion of the duct has not been destroyed, it may be tapped from the nasal side, by a procedure that at the same time will allow exposure of the anterior ethmoid

the sac should not be extirpated, but an attempt should be made to restore the function of the duct by intranasal dacryocystostomy. The operation should be done by one who is familiar with intranasal technic. If for any reason the operation should not accomplish the re-

sult desired the sac can always be removed later. West, Yankauer, Paterson and Fraser, and others report excellent results. They have restored function to the lacrimal drainage system in a large percentage of cases in which operation was done, which is vastly more than can be said for the extirpation or cauterly method of treatment.

An operation which restores function of the sac and provides adequate drain-

by blocking the sphenopalatine ganglion and the anterior ethmoidal nerve by introducing a cotton applicator impregnated with cocain mud with adrenalin as the solvent, beneath the posterior end of the middle turbinate, and a second applicator passed between the septum and the middle turbinate to the cribriform plate as may be seen in Figure 1. These applicators are allowed to remain in position ten minutes, which ordinarily gives com-

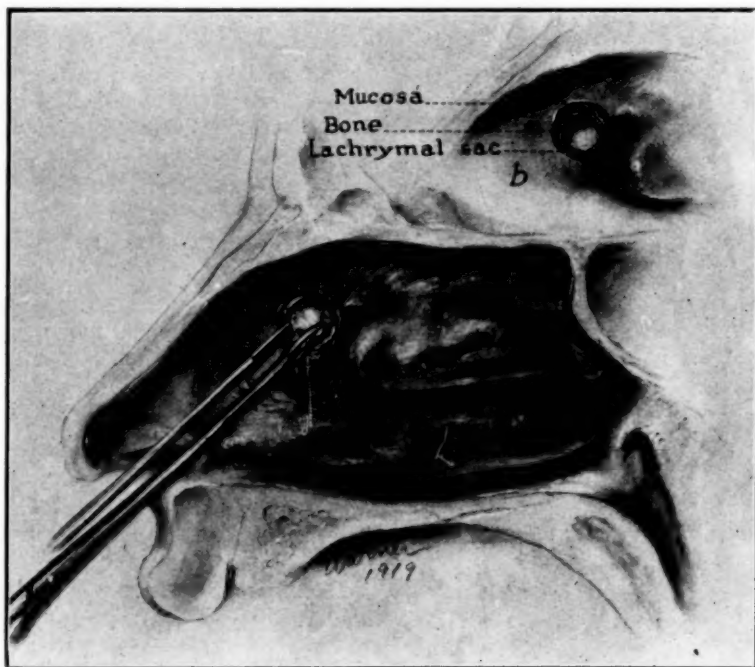


Fig. 4. Sac wall tented thru window opening, grasped by forceps, and beginning incision. b Window opening into sac completed, draining freely into nose.

age of diseased ethmoid cells in the neighborhood of the duct, should any be present, should be easy to perform and unattended by complications that will require long after treatment. Such an operation may be described as follows:

OPERATION.

Two or three drops of 1 per cent cocain solution are instilled into the eye. This allows the probe to be introduced into the punctum with little or no discomfort.

The intranasal anesthesia is obtained

plete anesthesia of the nasal chamber. In case of high or anterior septal deflection a submucous resection of the septum should be done at this time.

A lacrimal probe is now introduced through the lower punctum (without slitting the canaliculus) into the sac and duct as far as it will go, and allowed to remain. This serves as a guide and landmark. The surgeon while working in the nose is thus constantly reminded of the direction of the duct.

The mucous membrane of the agger nasi is now elevated and resected

and a flap about 1 cm. in diameter is removed just in front of the attachment of the middle turbinate. The bone is next removed by means of a small chisel to make a window slightly smaller in diameter than that of the mucosal opening (Fig. 2). This exposes the inner wall of the lacrimal sac and the upper part of the duct (Fig. 2a). Any diseased ethmoid cells which are discharging their contents into the duct can be easily broken down at this time.

The lacrimal probe is now withdrawn slightly until the tip causes a tenting of the sac wall into the opening made through the bone (Fig. 3). With a small knife the sac is incised (Fig. 4), the flap is grasped with a fine forceps, and the incision continued in a circular path, completely removing this portion of the sac wall (Fig. 4b). The probe is

now removed, and the sac irrigated through the punctum.

This completes the operation and gives adequate drainage into the nose. Very often a quantity of pus escapes into the nose when the first incision is made into the sac wall. The after treatment is almost nil. No packing is necessary. The patient should be cautioned not to blow the nose vigorously, as the secretion from the nasal chamber may be blown through this new opening into the conjunctival sac. The reaction is very slight, healing is rapid, with little contraction of the mucous membrane. The patients experience no epiphora nor other discomfort after the operation. A lotion of zinc sulphat and adrenalin solution is used for the first week following operation, after which time no further treatment is needed.

REFERENCES

1. Paterson, J. V. and Fraser, J. S. Intranasal Dacryocystostomy: Intranasal Drainage of the Lacrimal Sac. *Brit. Jour. Ophthal.*, iii, 197-204, May, 1919.
2. West, J. M. Die Eröffnung des Tränensackes von der Nase aus in über 100 Fällen von Dakryostenose. *Berl. klin. Wchnschr.*, 1, 926-927, May 19, 1913.
3. Yankauer, S. The Technic of Intranasal Operations upon the Lacrimal Apparatus. *Laryngoscope*, xxii, 1331-1346, Dec., 1912.

A SIX METER STEREOSCOPE

CAPTAIN HARVEY J. HOWARD, M.D., OPH.D.

PEKING, CHINA

The instrument here described was developed to meet the requirement for tests of binocular vision used at the Medical Research Laboratory of the Air Service Medical at Hazelhurst Field, Mineola, N. Y.

For the purpose of examining candidates for the flying service to learn their ability to judge distance, it was deemed necessary by the Eye Department of this laboratory to devise a test which could be used at a distance of six meters.

In a previous report (see p. 656) a description of an apparatus designed to make such a test was given. That apparatus was simple and crude, but at the same time gave very consistent results. The test was so planned that the only factor examined was the binocular parallax which is the most important personal factor in the judg-

ment of distance. The results obtained with the apparatus were in the form of threshold judgments of certain depth-differences. From these threshold findings, together with the measurements of interpupillary distances the minimal binocular parallactic angles (see Fig. 2 and Fig. 3, p. 661) of all the subjects examined were computed (Table 1, p. 663). In this previous report it was recommended that a normal binocular parallactic angle be considered not larger than 8 seconds, when employing a similar apparatus. Based upon the size of their respective angles, it was found possible to classify men

into groups, indicating their degree of depth judgment efficiency.

The findings obtained showed that very fine discriminations in depth perceiving ability were made possible by this apparatus. It therefore seemed advisable to employ the same principles in designing a more durable and compact apparatus which would be simpler to operate and permit of two methods of experimentation, instead of only one. The first apparatus required the operator to stand beside it, adjust the objects and lift a screen for each observation. In addition to this method it should be possible for the subject himself to adjust the objects into what he thinks is the same reference plane, i. e. equidistant from the eyes. After a series of such judgments, the average error would indicate his judgment threshold.

The apparatus recommended* consists of four essential parts:

1. An oblong box divided into two compartments with a window in one end.
2. A pair of round rods of equal diameter to serve as the test objects.
3. A stationary scale for recording the position of the rods.
4. A mechanism for the transmission of motion to the rods.

DESCRIPTION OF THE APPARATUS IN DETAIL.

1. The Box.

Figure 1 is a representation of the box in perspective. The inside dimensions show a length of 60 cm., a width of 24 cm. and a height of 20 cm.

A vertical milk glass partition divides the box into two compartments, viz., the front 40 cm. long and the back compartment 20 cm. long. In addition there is an elevation of the front end of 8 cm. above the top surface of the box. This is for the purpose of screening the mechanism on top of the box from the view of the observer. One side of the box is made removable. In the middle of the front end is a window 8x12 cm. The interior surface

of the front compartment, the margins of the window and the anterior surface of the front end of the box are all painted a dead black. The interior surface of the back compartment is painted a dead white. Near the rear of the back compartment are set two frosted, cylindrical electric lamps which are connected to an ordinary wall plug. Each lamp has a reflector facing the front to give high and equal illumination on the milk glass. Covering the window from behind is a Graflex shutter capable of any time exposure desired up to 1/1000 of a second.

In the top of the box are cut two parallel slits, each 12 mm. wide, extending from the front end of the box to the milk glass partition. The lateral distance between the middle points of the slits is 6 cm.

2. The test objects are two round wooden rods which are viewed thru the window in the front end of the box when the shutter is open. Each of the rods is 18 cm. long and 1 cm. in diameter. In order to be exactly duplicated they are made in a milling machine. At one end each rod is modelled to screw into a wooden or metal block (A, Figs. 3 and 4) which carries it in a vertical position along one of the parallel grooves. When set in the carrying block the lower end of each rod is about 1 cm. from the floor to give opportunity for unrestricted play and easy removal. The rods are painted a dead black or some other neutral color.

3. On top of the box, extending in the median line the length of the front compartment, is a millimeter scale. The zero mark on the scale is located at the center of this compartment, viz: 20 cm. in front of the milk glass partition.

4. The mechanism for the transmission of motion to the rods is shown in Fig. 2. This mechanism consists of several parts:

- (a) Each of the two sliding blocks (A) is 20 cm. long and 4 cm. wide and is made to fit a groove cut in the top (B) of the box. According to Fig. 4

*Authority to make, according to specifications, granted June 9, 1919, to Bausch & Lomb Optical Co., by the Supply Department, Hazelhurst Field, Mineola, L. I., N. Y.

there are three holes (1, 2 and 3) drilled in the under surface of each block to receive a rod 1 cm. in diameter. This makes it possible to put one rod in the extreme anterior position on one block and the other rod in the extreme anterior position of the other block, so that a total antero-posterior separation

of about 36 cm. may be obtained. Attached to the upper surface of each sliding block and opposite each one of the three possible positions of the rod is a scale marker or indicator which projects toward the median line of the box over the millimeter scale. During an experiment only that scale indicator

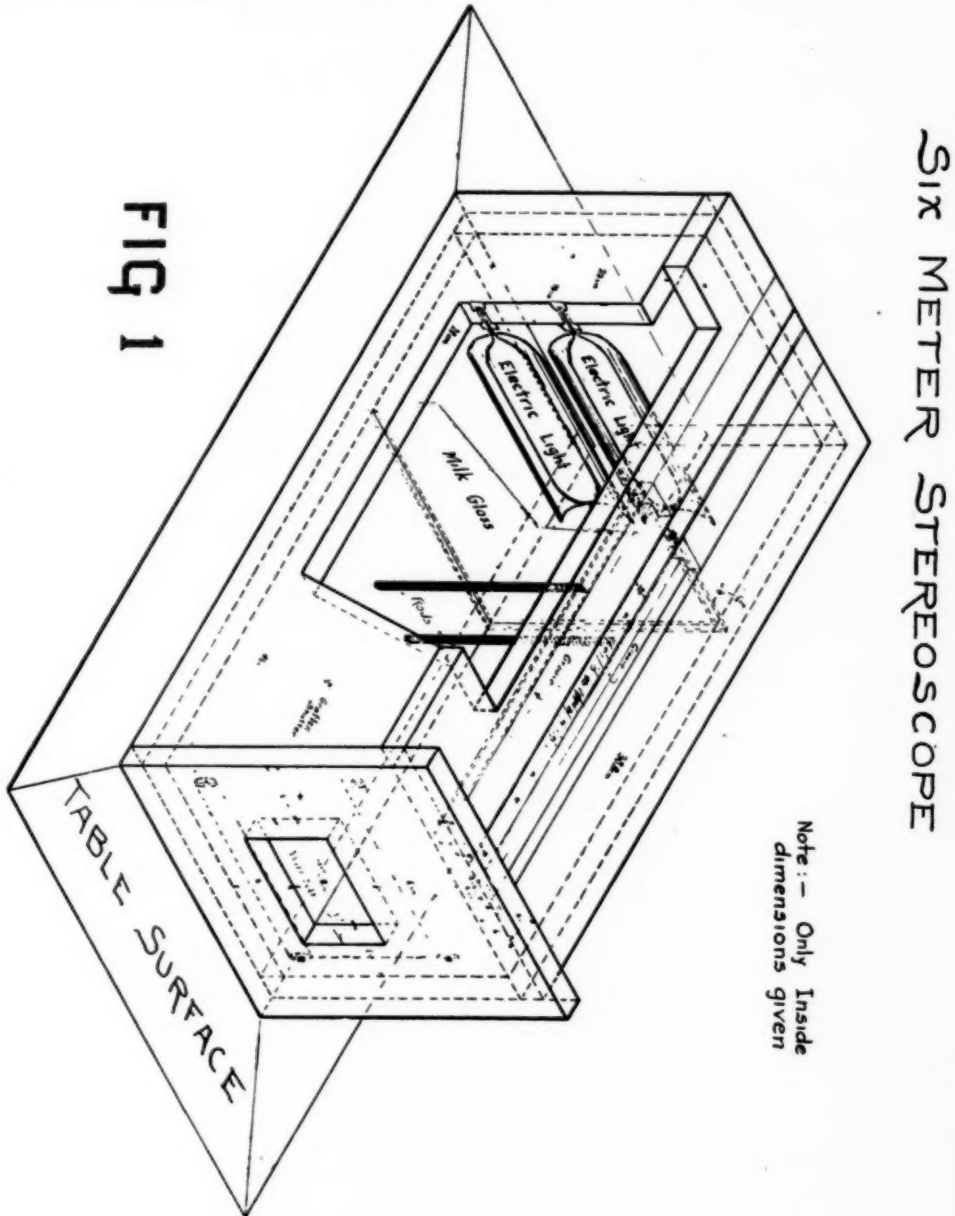


Fig. 1. For explanation see description on page 850.

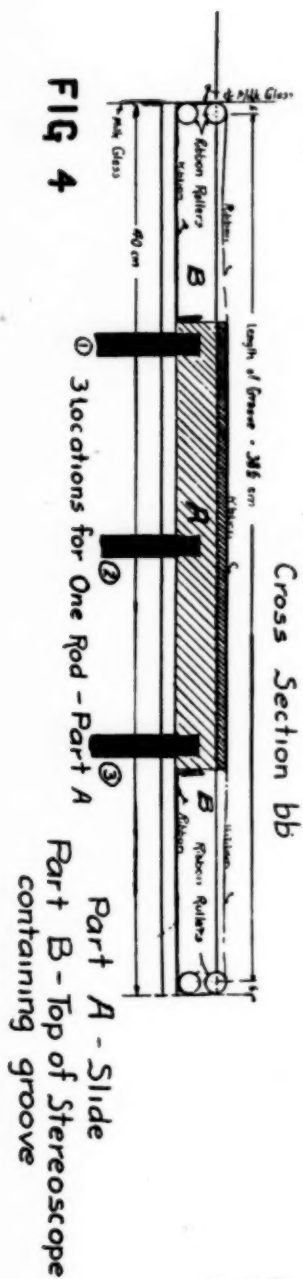
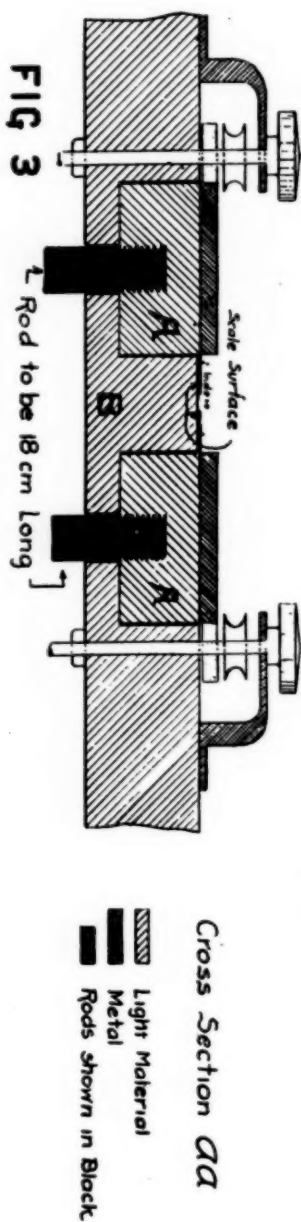
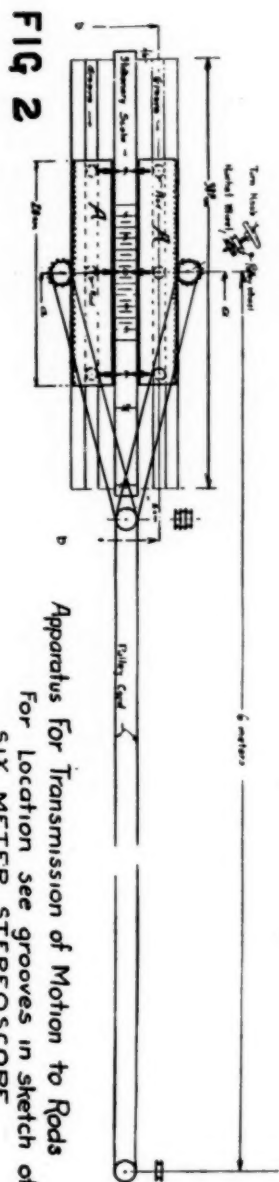


Fig. 2, Fig. 3 and Fig. 4. See explanation pp. 850 to 853.

is used which has a test rod opposite it.

(b) Each one of the blocks is propelled by a rack and pinion located on the top of the box. To the shaft of each pinion is attached a pulley wheel and a turning knob (Figs. 2 and 3). Just behind the front elevation at the midpoint there is a coordinating triple wheel pulley. One wheel carries a cord from the pulley of the right rack and pinion shaft, the second wheel a cord from the pulley of the left rack and pinion shaft, and the third wheel a cord from a pulley wheel is attached to a table six meters away from the center of the compartment. Two holes in the front elevation are boxed to receive the cord from this pulley on the table.

(c) In order to prevent the emission of light thru the slits in the top of the box, ribbons about 2.5 cm. wide are attached to the sliding blocks and run over the wheels as indicated in Figure 4.

TWO METHODS OF EMPLOYING TEST.

(1) A subject sitting at the table with his head fixed in a head-rest may move the rods by simply manipulating the turning knob of the pulley wheel attached to the table in front of him. As a preliminary to each observation the examiner sets the rods at unequal distances from the subject's eyes. The shutter is then opened and the subject

adjusts the rods into what he considers is the same reference plane, i. e., equidistant from his eyes. After a number of such trials the average error is recorded as his depth-difference threshold.

(2) In the second method the cards are removed. The examiner adjusts the rods and raises the shutter the same as before, but the subject is required to state which rod is nearer to him, the right or the left. The rods are first placed at a depth-difference of 30 mm. If the subject makes several judgments at this station correctly, the rods are placed successively at smaller intervals apart until the subject no longer is able to perceive a difference in distance. The shortest depth-difference at which he is able to judge correctly not less than 75 per cent of the trials is recorded as his depth-difference threshold.

PRINCIPLES AND FORMULAE INVOLVED.

For an understanding of the term "depth-difference" see Figs. V and VI. It will be observed that the greater the depth difference the greater will be the binocular parallax. Table 1 (see p. 662) is a computation of binocular parallax angles based upon interpupillary distances ranging from 57 mm. to 72.5 mm., and upon depth-differences ranging from 5 mm. to 360 mm., when the near object is six meters distant.

IMMEDIATE CAPSULOTOMY IN THE EXTRACTION OF SENILE CATARACT

ARTHUR G. BENNETT, M. D., F.A.C.S.

BUFFALO.

This is an account of the author's technic and experience with a cataract operation that he believes is not so widely used as it should be. It was presented to the Section on Ophthalmology of the American Medical Association, June, 1919, and is here published thru the courtesy of the JOURNAL OF THE A.M.A.

No originality is claimed in this paper, but I venture to draw attention to an old procedure that possesses advantages and is not beyond the skill of the average operator.

Years ago I was told by friends who had visited the Paris Ophthalmic Clinics, of Dr. Trousseau, who performed the operation of extraction of senile cataract with one instrument. Using his fingers to steady the globe and also the lids, with the knife he opened the capsule as he passed thru the anterior chamber and expressed the lens with his fingers. While this *coup de maitre* is spectacular, it contains several elements of risk that are unnecessary and which the use of a few more instruments would eliminate. The one essential feature, the immediate capsulotomy during the passage of the knife across the anterior chamber, is, I believe, worthy of consideration.

Few practicing ophthalmologists in America, outside of the large centers of population, see a sufficient number of patients to belong to the class of experts qualified to do the "Smith-Indian" operation, since, according to the gentlemen who do perform it, nobody extracting less than 100 cataracts a year can possibly acquire that dexterity of manipulation or that delicacy of touch, without which success is impossible. Therefore to the vast majority of operating oculists this method is barred, and also to the greater number of patients is denied the luxury of a clear pupil, even tho it be a dragged up and distorted one. Dr. Bulson, in discussion before this section, some years ago stated that the average operating oculists performed about twenty-five extractions per annum. This I believe

to be the truth, perhaps an overestimate rather than an underestimate. Outside of the large cities of New York, Chicago, Philadelphia, Boston, and possibly towns like Dayton, Ohio, where a large number of elderly people are congregated, few of us have the opportunity to see more than two or three cataracts a month.

In a fairly large practice this is about my average; therefore I have despaired of ever acquiring the skill to perform the Smith-Indian operation and have renounced all thought of ever attempting it. Recently, however, I have been tempted to depart from the classic capsulotomy, not opening the capsule with the forceps or the capsulotome, but using the point of the knife in its passage across the anterior chamber. I have been so much pleased with the result that I venture to urge the procedure on the respectful attention of my colleagues who are in my class, and have not reached the minimum annual extractions to qualify them to enter the class of experts who so ably remove the lens in its capsule.

I have performed this operation twenty-six times during the last fourteen months and believe the advantages to be the following:

1. Only one instrument is introduced into the anterior chamber, thus minimizing the chances of infection.
2. The lens is supported by the aqueous humor so that there is less danger of rupturing the suspensory ligament and thereby losing vitreous. In twenty-six cases only twice have I lost any vitreous at all, and then only a small quantity.
3. The clean-cut opening in the center of the capsule gapes open, leaving

a clear center; and unless the posterior capsule is opaque, no secondary needling is necessary.

AUTHOR'S TECHNIC.

There is a certain technic to be followed in doing an immediate capsulotomy, and the method to be described has been found the most advantageous:

In the preparation of the patient the pupil should be thoroly paralyzed, not merely dilated, to permit of as large an incision being made in the capsule as possible, and further, the pupil should be so wide as to permit the lens to escape without being squeezed by the contracting fibers of the iris, and cortex retained. This point is an important one from another standpoint. I believe that a dilated (paralyzed) iris is much less liable to prolapse than a contracted one, and also that an unbruised iris is less prone to develop iritis. A dilated iris is, of course, thicker than a contracted one; and during the period that elapses until the wound is healed, while the aqueous is still escaping, there is much less danger of prolapse taking place. I do not subscribe to the doctrine that phsyostigmin (eserin) should be used after a simple operation to prevent prolapse, because I believe that it really encourages it, producing, as it does, a greater surface for the escaping aqueous to push against. In consequence of this conviction, therefore, I have atropin sulphat, 1 per cent, instilled in the patient's eye twice, two hours before operation. This is usually sufficient to paralyze completely the iris as shown at the time of operation by the pupil's remaining dilated after the lens has been extracted. Of course, the usual preoperation preparation of sterilization now practiced by all of us is carried out, and the cleansing of the eye by a boric acid douche when the patient is on the operating table.

One very necessary part of the correct performance of any cataract extraction is perfect local anesthesia, and this is best secured by the subconjunctival injection of cocain and epi-

nephrin administered after the instillation of cocain until the conjunctiva is insensitive. I have never seen any harm come from this injection, and it certainly prevents sudden jerks by a nervous patient, that do occur if there is even a suggestion of pain.

In making the incision I take nearly one-half of the cornea, and immediately the knife has passed the edge of the pupil, the point is depressed and the capsule entered; the point should not be carried in deeply, only just under the capsule, and made to emerge just at the opposite edge of the pupil. Then it is carried over to the other side of the cornea, the counter puncture is made, and the section is completed with a conjunctival flap. The conjunctival flap gives me a sense of security that I do not have if I make a purely corneal incision.

The speculum is now removed and the patient instructed to look down. Then, with one thumb on the upper lid and the other on the lower, the lens is gently expressed. I have been astonished to find how much more cleanly one can express the lens with one's fingers than by the intervention of spoons and spatulas. The contour of the lower lid, fitting as it does the curve of the cornea, seems to make a more even pressure on the whole surface of the lens, and expresses it in a more compact mass than the Daviel spoon. Rarely have I seen any cortex remain, even in immature cataracts. It has not been necessary to wash out a single anterior chamber in any of my cases, and with the classic capsulotomy this was a frequent procedure and an added danger.

After the lens has been extracted, inspection of the eye is made to see if any cortex is remaining and if the iris is in place; frequently nothing more remains to be done save to apply the dressings. Occasionally the iris may not have returned to its proper position; then a few strokes of the spatula will release it from its entanglements, and the pupil will assume the normal round shape. atropin, 1 per cent, is then instilled,

White's mercuric chlorid ointment¹ is inserted between the lids, and both eyes are bandaged for forty-eight hours.

ADVANTAGES OF THIS OPERATION.

1. As no iridectomy is performed, a round pupil results.
2. A minimum of instruments are introduced into the eye, thereby lessening the danger of sepsis.
3. The gaping of the lens capsule, leaving a clear center, obviates the necessity of a secondary needling in the majority of cases.
4. The very short time that the speculum is used lessens the danger of loss of vitreous.
5. The ease with which the operation is performed. Any operator who can make a decent section can open the capsule more readily with the knife point than he can with either the capsulotome or the capsule forceps.
6. The lens can be more readily and more cleanly expressed with the fingers than with any instrument.

OBJECTIONS TO THIS OPERATION.

1. The anterior chamber is shallow. There is danger of the iris falling over the knife while the section is being made. This, of course, applies equally to any form of cataract extraction, and can be met by a preliminary iridectomy. However, if a round pupil is desired it can be obtained by a method described by Brudenell Carter many years ago, which I have used several times, with two keratomes. The cornea is opened simultaneously on opposite sides just above the usual point of puncture and counterpuncture, and the wounds are made so that the upper portion of each approach each other toward the summit of the cornea; one of the instruments may be made to enter the lens capsule, thereby making the capsulotomy. On the withdrawal of the keratomes there will be left a bridge of corneal tissue which can be divided with a blunt pointed cataract knife which can be made to glide be-

tween the iris and the posterior surface of the cornea, without wounding either. This is a very satisfactory method when the anterior chamber is so shallow that difficulty is anticipated.

2. The fingers or the thumbs are used to express the lens. The late Dr. Beard was very severe in his condemnation of the procedure, urging the danger of expressing bacteria from the meibomian follicles. The objection is, however, more theoretic than real. The force used is so slight, the gentlest pressure being sufficient to express the lens and totally inadequate to force out the contents of the meibomian follicles, that I have never seen any infection follow the use of the fingers and do not expect to. The use of an antiseptic dressing for some hours before operation also reduces this danger to a minimum.

3. There is danger of prolapse of the iris. Since I have insisted on the use of atropin until the absolute paralysis of the iris is obtained, I do not fear this danger, particularly if a conjunctival flap is made on completing the section. This closing of the wound in a few hours prevents sudden gushes of aqueous, which tend to carry the iris into the wound, particularly if the iris is not paralyzed, and more so if contracted by physostigmin.

4. Dislocation of the lens, with subsequent loss of vitreous, conceivably might occur if the capsulotomy were made too deeply; but if the capsule itself is cut and the lens merely touched, it is not liable to happen. The lens is well supported and held in position by the unescaped aqueous and, unless the knife is clumsily wielded, should not be dislocated. Still this has happened once with me in an overripe lens with an unruly patient, and the result obtained was a Smith-Indian pupil, as the lens escaped in its capsule. However, as the speculum was out of the eye but little vitreous was lost and a very good result was obtained. Unfortunately, however, this patient ultimately lost his vision from a severe retinal hemorrhage one month after operation. He was a man of 77 with hard arteries, and

1. The ointment is composed of 1:3,000 mercuric chlorid in petrolatum.

there is a legitimate doubt as to whether the operation was in any way responsible for his loss of sight. We have all seen retinal hemorrhage occur in cases of arteriosclerosis without any operation. However, I did learn a lesson from the case. I should not attempt an immediate capsulotomy in an overripe lens for two reasons:

(a) The weakened attachment of the suspensory ligament is liable to cause it to rupture easily and induce loss of vitreous.

(b) The capsule, which is generally

thickened, does not divide easily, as it does in a lens that is not hypermature.

I therefore deprecate this method in such cases, preferring to open the capsule with the forceps and extract after an iridectomy to obviate the distorted pupil, which is so commonly the result when the lens escapes in the capsule. As to the ultimate results, the accompanying table compares favorably with others that I have seen published, and altho the number is small, may encourage my colleagues in my class to give this method a trial.

RESULTS OF OPERATIONS.

No.	Date	Initial	Sex	Age	Eye	Refraction	Vision	Remarks
1	12/ 2/17	C. V.	F	73	R	+10.00 sph.	20/20	
2	2/12/18	E. M.	F	80	L	Myopic	No central vision	Central choroiditis
3	2/ 7/18	P. C.	M	72	R	+10.00 sph. \odot +2.00 cyl. ax. 15	20/50	Iris fell over knife, and excised piece fell to bottom of anterior chamber.
4	5/27/18	F. L. P.	M	70	R	+ 8.50 sph. \odot +3.00 cyl. ax. 15	20/100	Report eye injured 50 years ago and has been blind with this ever since.
5	6/20/18				L	+12.00 sph. \odot +1.00 cyl. ax. 180	20/30	
6	5/27/18	J. O.	M	66	R	+ 9.00 sph. \odot +3.00 cyl. ax. 165	20/25	
7	11/22/18				L	Not refracted	—	
8	6/19/18	L. A.	M	66	R	+ 9.50 sph. \odot +2.50 cyl. ax. 180	20/30	A secondary needling necessary.
9	7/11/18	W. S. M.	F	60	R	+11.50 sph. \odot +2.00 cyl. ax. 180	20/50	
10	6/18/18	R. J.	M	70	L	+10.00 sph.	20/20	Lens immature
11	6/12/18	L. J. S.	M	71	R	Dense capsule given +10.00 sph.	Acknowledges "a touch of syphilis"; paralysis agitans
12					L	+ 9.00 sph. \odot +2.50 cyl. ax. 180	20/30	
13	6/26/18	F. B.	M	72	R	+ 6.50 sph. \odot +3.50 cyl. ax. 165	20/40	Right capsule should be needled, but patient is satisfied with present vision
14					L	+ 7.50 sph. \odot +2.50 cyl. ax. 20	20/40	
15	9/18/18	C. F.	M	84	L	+ 7.00 sph. \odot +3.00 cyl. ax. 15	20/50	A practicing dentist; has resumed professional work
16	9/25/18	A. P.	F	64	R	Not refracted nearing +10.00...	
17					L	+ 9.50 sph. \odot +2.25 cyl. ax. 15	20/40+	Right eye operated on later with small prolapse of iris; is satisfied with +10.00.
18	11/ 5/18	J. S.	F	57	R	+ 7.50 sph. \odot +5.00 cyl. ax. 165	20/40	Iris caught on knife in making section
19	11/16/18	J. F.	M	77	L	Loss of vitreous.....	%	Retinal hemorrhage 1 month after operation.
20	11/21/18	F. S.	F	63	R	+10.00 sph. \odot +2.00 cyl. ax. 175	20/30	Patient had chronic glaucoma of both eyes; I trephined both eyes 12/14/17; both lenses became opaque
21	1/18/18	H. H.	M	69	R	Not yet refracted.....	Right lens, hypermature capsule tough; slight loss of vitreous; left, no loss of vitreous
22	3/14/19				L	+11.50 sph. \odot +1.75 cyl. ax. 15	20/40	
23	1/19/19	J. S.	M	67	R	+ 8.50 sph. \odot +4.00 cyl. ax. 180	20/40	A case of ozena with dacryocystitis; both canaliculi destroyed with dichloroacetic acid; healing uneventful
24	6/ 4/18	W. S.	F	61	L	+10.50 sph. \odot +2.00 cyl. ax. 15	20/30	
25	11/24/18	S. G.	F	60	R	Not yet refracted.....	
26	2/12/19				L	Not yet refracted.....	

COMMENT.

An analysis of the twenty-six cases shows: Two eyes, 20/20 vision; one eye, 20/25 vision; five eyes, 20/30 vision; six eyes, 20/40 vision; three eyes, 20/50 vision; one eye, 25/100 vision; six eyes not refracted; three too early; two should be needled; one satisfied with +10.00 sph.; one eye, no vision because of central choroiditis; one eye, no vision from retinal hemorrhage.

Seventeen of the patients obtained 20/50 or better. The patient with 20/100 had been blind in this eye for fifty years from accident, and any vision was better than what he had for so long.

I was very much disappointed in Case 2, as it was ideal from an operative standpoint. The patient's projection before operation seemed perfect. However, when she came for refraction an old central choroiditis was discovered and the vision was eccentric.

I have referred to Case 19 earlier in the paper.

I wish briefly to call attention to Case 20: This woman had chronic glaucoma of each eye with tension of 56 mm. and a rapidly deteriorating vision. The lenses were slightly opaque. I trephined both eyes December 14, 1917, and stayed the glaucomatous process. However, the lenses continued to become more and more opaque, and, November 21, 1918, I re-

moved the right one. In making the trephine operation I buttonholed the iris, leaving a round pupil. At the cataract operation the lens was removed through the intact pupil. The resulting vision is 20/30.

Patient 9 was a man of 70 who acknowledged specific infection; he was also a sufferer from paralysis agitans. At the time of operation my assistant was obliged to hold his head steady the entire time, and altho it was possible to control this, his lower jaw persisted in its agitation, and I can assure you that it is disconcerting to have a patient gnash his teeth at you all the time you are performing a delicate operation. However, the outcome was very successful. Vision is 20/20 with a +10.00 sph. with a perfectly mobile pupil.

Of the six cases on which I cannot yet give the ultimate vision, three were too recent to be refracted at the time this paper was written. Two should be needled because of opaque posterior capsule, and the remaining one is satisfied with a +10.00 sph., which was given to balance the weight of the lens prescribed for the first operated eye. All these six eyes promised to give an average result, when finally fitted, at least equal to those reported.

Finally, I wish to urge my confrères that are in my class to give this method a trial, and I can assure them that they will not be disappointed.

PARALYSIS OF ACCOMMODATION DUE TO FOCAL INFECTIONS.

CLARENCE A. VEASEY, M.D.,

SPOKANE, WASHINGTON.

This report of three additional cases was read at the meeting of the American Ophthalmological Society, June 17, 1919. (See discussion p. 879.)

At the meeting of the Pacific Coast Oto-Ophthalmological Society in June, 1916, I presented a paper on "Chronic Infections of the Faucial Tonsils as a Causative Factor in the Production of Paralysis of the Accommodation with the Report of Two Cases."

One of these cases was treated for some time for the paralysis of accom-

modation without result, and within four days after the removal of the infected tonsils, the patient was able to read Jaeger 3, and within six days from the time of the operation the accommodation was entirely restored.

The second case was given no treatment for the ophthalmoplegia and within three days after the removal of

his infected tonsils the accommodation was entirely restored.

In the same paper another case of paralysis of accommodation due to a focal infection is referred to as having occurred in the practice of Dr. T. B. Holloway, of Philadelphia, who was kind enough to give me the notes, the latter case being due to a streptococcic catgut infection.

Since the above report was presented, a number of other similar reports have appeared in the literature, not only from chronic infection of the faucial tonsils, but from focal infection occurring elsewhere, and I wish now to present briefly a report of three additional cases.

Case 1. Miss Blank, aged twenty-one, known by the writer all her life, while on shipboard returning from a three months' sojourn in the Hawaiian Islands, complained of difficulty in reading fine print. But little attention was paid to the complaint at the time and the condition gradually progressed.

The patient's general health was excellent. There had never been any trouble with the eyes before. She had a very moderate astigmatism, using in R. + cyl. 0.25 D. axis 90°, and in L. + cyl. 0.37 D. axis 90°. The vision of each eye at the time of refraction two years before was 6/5+, both with and without lenses.

After reaching home the patient's eyes were examined and she was found to have 6/5 vision in each eye, both with and without glasses, and there was found to be an almost complete paralysis of accommodation. The eye grounds were normal.

About nine months before the patient had had an infection of the right antrum which cleared up under a few irrigations. Examination at the time of studying the eyes showed no infection of the accessory nasal sinuses, no pus in the nares, and no pus could be expressed from either of the faucial tonsils. A skiagraph of the teeth showed slight absorption at the root of one of the central incisors, a tooth which had been filled, but the filling did not extend to the bottom of the pulp cavity. This tooth was opened

and drained and within two weeks the accommodation had entirely returned.

Case 2. Miss B. M., aged about thirty, a graduate nurse holding a responsible position in a large hospital, first observed forty-eight hours before being seen by me that she could not read ordinary print with the right eye. At the time of the examination the vision was, R. 6/30, and L. 6/6. In the right eye the pupil was widely dilated and immobile. There was complete paralysis of accommodation. No gross fundus changes were visible.

In the left eye the pupil was 4 mm. in diameter, normal in reaction, and she could read Jaeger 1; p.p. 7^{1/2}.

An examination of the nasal accessory sinuses was negative. All of them transilluminated well, and there was no free pus in the nose. Large quantities of pus could be expressed from each faucial tonsil, the latter being cryptic in character. The blood, Wassermann and urine were negative. The patient stated that she had formerly had an attack of appendicitis, the appendix not having been removed, but an examination by her surgeon resulted in the report that there was no trouble at the present time and it was not believed that any focal infection could have arisen from this portion of the body. An examination of the teeth also was negative.

With the belief that the chronic infected tonsils might possibly be the cause of the paralysis of accommodation, they were removed under local anesthesia. Three days later the accommodation was returning, the pupil was much smaller, and the patient could read large print on a magazine cover. Inasmuch as she was in bed at the hospital, no actual measurements of the accommodation were made at this time. Five days after the operation the patient read easily Jaeger 6. One week after the operation the accommodation had entirely returned and Jaeger 1 was easily read, both pupils being equal in size and normal in reaction.

Case 3. E. B. T., female, married, aged about 26 years, was first seen January 31, 1919. She presented a

history of great difficulty in reading from time to time, altho, according to her statement, her distant vision was fairly good. There was also a history of hemicrania and some complaint of gastrointestinal disturbance.

The vision for the right eye equalled 6/6, and the patient at the time of the examination read with great difficulty Jaeger 1, p.p. 14 inches. The vision of the left eye was 6/7.5, and the patient read Jaeger 3, p.p. 15 inches, with great difficulty.

Examination of the nose and throat showed marked deflection of the nasal septum, but no pressure was present and no free pus in either naris; there were chronically diseased tonsils and a large, ragged adenoid filled with crypts.

Further tests showed that the patient had an impaired accommodation, and the immediate removal of the tonsils and adenoids was advised. It was not believed by the patient, however, or the patient's husband that the tonsils and adenoids could have anything whatever to do with the ocular condition, and the removal of the tonsils and

adenoids was therefore postponed until some months later, the eyes continuing in the same condition in the meantime. Within two weeks after the removal of the tonsils and adenoids, the patient was again examined, and the vision for R. was 6/6, the patient reading easily Jaeger 1, p.p. 9 inches, and for L. 6/5, reading Jaeger 1 easily, p.p. 7 inches. The general health was also very greatly improved.

This last case was not, at the time that she first came under observation, one of complete paralysis of accommodation, but one of paresis. It is understood that at times the accommodation had been completely paralyzed, and the fact that the condition cleared up so rapidly after the removal of the tonsils seems to place it in the same class with the other two cases.

It is believed that in each instance the paralysis or paresis of accommodation was due to a focal infection, in the first case the absorption at the root of the central incisor giving rise to the focus, and in the second and third cases the focus being found in the chronically diseased tonsils.

ACCOMMODATION IN THE LENSELESS EYE.

A. EDWARD DAVIS, A.M., M.D.,

NEW YORK CITY.

This discussion of apparent accommodation after removal of the lens is based upon the case of a woman, aged 73, who had been subjected to cataract extraction. Read before the American Ophthalmological Society, June 17, 1919. (See p. 881.)

In 1895¹ the author reported two cases of accommodation in the lenseless eye, one in a young subject, the other in a man 42 years of age, both following extraction of cataract, together with a review of the literature on the subject up to that date, 1895.

Having observed another even more remarkable case of the same nature, occurring in a woman 73 years of age, I have thought it worth while to report the case before this scientific body, and to have an expression of opinion on the question, to wit, *whether the lenseless eye has accommodative power.*

Förster, Woinow, von Graefe, Silex,

Jaeger, Loring, the author, and many others maintain that accommodative power, in exceptional cases, is present in the lenseless eye; while such eminent authorities as Helmholtz, Donders, Manhardt, etc., oppose this contention, Donders² declaring that his investigations had convinced him, "that in aphakia not the slightest trace of accommodative power remains"; and further, "In old people, and with imperfect acuteness of vision, observers sometimes think they are able to prove the existence of a certain amount of range of accommodation; but in young persons, with perfectly clear pupils and great acuteness of vision,

in whom precisely we might still expect to find some accommodative power, it is quite evident that the latter is entirely lost."

Donders then reports two cases in young people in whom the lens had been removed by discission, with excellent result, the vision being extraordinarily acute in one case, in which no trace of accommodative power could be demonstrated. His method of testing the accommodative power was the familiar one of looking at a point of light in the distance with the refractive error properly corrected. "With glasses of $1/3$, placed at 5" from the eye, he saw, at a great distance, a point of light sufficiently round and perfectly defined. A sight (*vizier*) was placed in the direction between one of the eyes and the point of light, and when he looked with converging visual lines towards the sight, the point of light remained unchanged or became somewhat smaller and sharper, without changing its form. If the lens was removed only $1/4$ " more, or less from the eye, the distant point of light had ceased to be a defined, round point, and was elongated in one direction, to the form of a line; now even with the most powerful exertion, and convergence in the point of sight, the line of light became only somewhat shorter, without, however, a point making its appearance. This shortening, as well as diminution of the acutely seen point, depended upon narrowing of the pupil, which was, indeed, directly observed."

In a second case, a similar test was made with a like result, and an additional test was made, to wit: While the patient was looking at the point of light with his correction on, Donders interposed a weak plus ($1/180$) or minus glass ($1/180$) in front of the eye, which produced the well-known change in the point of light; the patient constantly stated that "by $+1/180$ (.25D) the point of light was extended in the vertical, by $-1/180$ (.25D) in the horizontal direction to a short line. On the other hand the convergence of the visual lines, with the effort to see near objects, was not followed by the slightest change of form, consequently, there was no reason to suppose the existence of accommodative

power². The same experiment was repeated with a lens of only $1/300$ (about .12D) with similar results, consequently, Donders concluded that not a trace of accommodative power was left in the lenseless eye, even in young subjects.

Donders did not give the result of his tests with Snellen or Jaeger types, but used only a point of light.

I have given both of Donders' tests rather fully, in order to show the error made in the first; and the unreliability of the second. In the first he states that he moved the correcting glass $1/3$ (or $+12D$) slightly ($1/4$ "') from the eye, then had the patient make accommodative efforts to correct the blurred image which had been brought about by moving the glass forward. I submit that the correcting glass should have been moved toward the eye (backward) if the accommodative effort was to be tested. In regard to the second test of interposing a very weak glass (plus or minus) in front of the correcting glass, and noting if the image is elongated in the vertical meridian by a plus glass, or in the horizontal meridian by a minus glass, is often most contradictory and unsatisfactory. In other words, I do not think Donders made sufficient tests to prove his contention,—that no trace of accommodative power remains in the lenseless eye.

It is interesting to cite here the case reported by Loring, of an exactly similar type to the two reported by Donders, in which Loring arrives at diametrically opposite conclusions to those of Donders. The patient was a young girl, aged 18 years, in whom both lenses had been removed by discission: "The pupils were round, free from membrane and active. With $+1/3\frac{1}{2}$, the patient read with either eye fluently Snellen XXX, and was able, with both eyes, to pick out most of the letters of XX at twenty feet. She could read No. X at ten feet, and No. V. at five feet. With the same glass, and with no change of position on the nose, she read No. $1\frac{1}{2}$ Snellen fluently, holding the book naturally at twelve inches, which was about the same distance at which she usually read. The book was then gradually withdrawn, the patient reading aloud while this was done. It was found that

twenty-one and a half inches was the greatest distance at which No. 1½ Snellen could be read. She read No. 1 Jaeger at twenty inches. The book was then advanced inch by inch, the patient reading aloud till the book was within five inches of the eye. Inside of this, reading was impossible. These experiments were tried over and over again by myself, and were finally repeated in the presence of a brother oculist. This would give the patient an adaptability of the eyes for different distances from twenty feet (or parallel rays) to five inches; or, in other words, an accommodation of $1/5$ ($A = 1/5$) and a relative accommodation for the very finest print from twenty inches to five ($A = 1/6\frac{1}{2}$)."

One could not ask for more convincing proof of accommodation in the lensless eye, than the report of the above case of Loring. However, one of the cases formerly reported by myself, already referred to, is just as convincing¹. Very briefly stated, the salient points in the case are: The patient, a man 42 years of age, had combined extraction of a black cataract in the right eye, January 17, 1894. Three months after the extraction $V = 20/10$ with $+ 11.50$ D, and with the same glass, which he did not move on his nose, he read Jaeger No. 1 from 14" to 18". On February 4, 1895, the patient maintained his marked acuteness of $20/10$ with $+ 11.50$ D, and read Jaeger No. 1 from 8" to 22½". The shape of the pupil in this case was an irregular vertical oval from the iridectomy, and free from membrane, except a very narrow margin at the edge. The transverse diameter was 3½ mm., the vertical about 7 mm. This patient was presented before the New York Ophthalmological Society in October, 1894, but the members were divided in their opinions as to how the patient was able to accommodate for the near point.

REPORT OF PRESENT CASE.

Mrs. J. H. B., aged 73 years, in fairly good health, consulted me, January 18, 1919. Senile cataract in each eye, mature in the left; R. V., fingers 4 feet; L. V., L. P. projection, good.

February 7, under cocain anesthesia, a combined extraction was performed on the left eye. There was an uninterrupted recovery, and the patient was discharged from the hospital on the seventh day. March 22, six weeks after the operation, she was tested for glasses with the following result: Ophthalmometer—Astigmatism against the rule, 2.50D. L.V. = $15/30$ with $+ 16D \subset + 1.50$ cyl. ax. 150° . The patient reads Jaeger No. 1, 7" to 13" with the same glass without changing position or tilting the same. By preference, she holds ordinary newspaper print at 8 inches. The ophthalmoscope shows H. 16 D and the media clear. The pupil is closed by a membrane, except for a clear space at the center, vertically oval in shape, 2½ by 3 mm. in diameter.

The patient, when she came under my care, was wearing R. eye $+6D \subset +2C$ ax. 60° , L. eye $+6D \subset +2C$ ax. 135° . She gave a history of having strabismus in childhood, which "was cured by having the ears pierced*."

It is significant that the patient later in childhood wore strong convex glasses which likely accounts for the cure of the squint without operation.

Extensive and rigid tests were made in the two former cases reported by me, and the same were repeated in the present case. Subjective tests: 1. (a) Acuteness of vision for distance and near point, with the distance glasses; (b) same with upper lid held up; (c) same with a few drops of cocain instilled and speculum to hold lids open; (d) adding weak plus or minus glasses to distant glasses and noting changes in acuteness of vision; (e) to repeat the

*Dr. A. E. Davis, New York City.

Dear Dr. Davis:—In answer to your letter of the 5th inst. regarding Mrs. J. H. B., I find that I examined her eyes on March 27, 1915. At that time her vision was:

O. D. $20/100$ w $+ 6.00$ D. Sph. $+ 2.00$ D. Cy. ax 60° .

O. S. $20/100$ w $+ 6.00$ D. Sph. $+ 2.00$ D. Cy. ax 135° .

The centers of both lens were sclerosed. Another peculiarity about this case is that when a child she had squint which was cured by piercing her ears.

With kind regards, I am,

Yours truly,
T. H. FARRELL.

above tests with the opposing eye uncovered, and with the visual lines converging. 2. Testing the acuteness of vision for a distant point of light (after Donders' methods), under the five conditions imposed in test No. 1.

Objective tests: 1. (a) Measurement, with the ophthalmometer, of the radius of curvature of the two chief meridians of the cornea at the point where the visual line intersects same; (b) same measurement five degrees to the temporal side of this point, which is close to the apex of the cornea, as the angle alpha is usually positive, and about five degrees in amount. 2. (a) With the Placido disc removed from the cylinder of the ophthalmometer, and with the patient looking five degrees to the inner or nasal side, to note if any changes are made in the relative position and size of the corneal images when the eye changes from looking in the distance to a near point, *the eye not changing its direction*; (b) the same test with the lids held open with a speculum; (c) with the opposite eye uncovered both of the above tests repeated. 3. Ophthalmoscopic measurements of the fundus were made, to see if any change in depth occurred when the eye changed from a state of rest to accommodative efforts. 4. The size and shape of the pupil, if clear, or partially filled with membrane, activity, etc., noted. All of the above tests were carefully made in the present case, with the visual results noted in the case report, that is, vision 15/30 w+16D \ominus +1.50 cyl. ax. 150°; and with the same glass, without being moved or tilted in any way, she read with ease, and as a matter of choice, Jaeger type (No. 1) at 7". And after atropin had been instilled three times a day for three days, Jaeger No. 1 could still be read from 8" to 13", the near point having receded from the eye one inch, under the influence of the cycloplegic*. This would indicate that, in this patient at least, the ciliary muscle had some influence on the accommodation, even after the lens was removed; for without atropin in the eye, the patient could read

Jaeger No. 1 at 7", while with atropin in the eye, the Jaeger No. 1 could not be read closer than 8". Now the difference between a lens of 7" focus (5.71 D) and one of 8" focus (5. D) is .71D; that is, the ciliary muscle exercised accommodative effort of .71D, about three-fourths of a diopter. (When the right eye was covered in these tests, it was seen to turn in, and the pupil to contract for the near point.)

Donders' test with a point of light in the distance, where weak plus or minus glasses were interposed in front of the correcting glass, proved unsatisfactory, as the patient made contradictory statements.

As to the objective tests in this case, the ophthalmometer showed an astigmatism of 2.50D against the rule, the lesser refracting meridian being at 60° (40.50 D), while the stronger refracting meridian was at 150° (44.D) in refractive power.

When the patient made accommodative effort on looking into the tube of the instrument (the images of the mires having been approximated just so they touched before the effort was made) the images would overlap about .75D in the meridian of 150° and became slightly blurred, and the instrument had to be pulled slightly away from the patient to get a clear image. But little or no change took place when this experiment was tried with the meridian at 60°.

It was impossible to detect any change in the depth of the fundus of the eye with the ophthalmoscope when the eye changes from a state of rest while looking in the distance and when making accommodative effort. However, that the curve of the cornea can be changed, by accommodative effort, to a slight extent at least, in the lenseless eye, is shown by two of my cases. In the normal eye the change in curvature of the cornea by accommodative effort is in some cases very marked. The most marked case of this kind that I have seen occurred in the person of Dr. C. H. Johnson, a former house-surgeon at the Manhattan Eye and Ear Hospital. The ophthalmometer

*These tests were repeated in the presence of a fellow oculist, Dr. F. W. Shine.

showed him to have ordinarily an astigmatism .50D. ax. $90^\circ + 180^\circ$ —each eye. He could, however, without in any way changing the direction of the eye, voluntarily, by efforts at accommodation, change this astigmatism in the right eye to 2D., and in the left to 1.50D. He was able to do this while the upper lid was held up with the finger, showing that it was not due to lid-pressure. He did this many times, and the same change was observed by a number of the staff at the hospital. Desiring to know if this change was due to the action of the ciliary muscle or to that of the external muscles of the eye, I wrote to the late Dr. J. M. Ray, of Louisville, where Dr. Johnson resided, to put Dr. Johnson's eyes under the influence of a cycloplegic (the doctor permitting), and in that way eliminate the question of the ciliary muscle. I give his report:

"V. R. E. 20/20; V. L. E. 20/20. Ophthalmometer shows astigmatism with the rule, .50D ax. $70^\circ 160^\circ$ Rt.; $90^\circ + 180^\circ$ —Lt. When he made an effort at accommodation without changing the direction of his eye, the astigmatism can be seen to go up to 2D in R. and 1.50D in L. Scopolamin, four instillations of 1/5% solution, apparently paralyzed accommodation. Then with the ophthalmometer the astigmatism still seems to increase in the right eye to 1.50D, and in the left to 1.D."

From this it appears that, in Dr. Johnson's case at least, the change in the curve of the cornea was brought about mainly by the external muscles of the eye, as the influence of the lids and ciliary muscle was eliminated.

My own conclusion, from studying the history of the subject, and from the careful and complete tests made in the three cases reported by me, is that the accommodation present in the lenseless eye is due chiefly to the ability of the patient, in such cases, to interpret dispersion circles. The slight change in curvature of the cornea, and its slight advancement observed in some cases, may, in those cases, account for some of the accommodative

power present, but it is such a small factor that it may be eliminated entirely, especially since in some of the most marked cases of accommodation in aphakic eyes no such changes have been observed. How the change in the curvature of the cornea and its advancement are brought about have been discussed in this paper already.

Altho, as Loring says, "It would seem impossible that the ability to read the finest print at five inches (which was done in his case), even taking into consideration the magnifying power of the glass, could be due to the overcoming of the circles of dispersion," yet I believe such to be the case, and for the following reasons: First, to the great increase in size of the retinal images by the removal of the crystalline lens and replacing it with a lens in front of the eye. By this procedure the united nodal point is moved forward, and this, with the magnifying power of the glass in front of the eye, greatly increases in size the retinal images. Donders² has shown by calculation, that a convex lens of three-inch focus, placed one-half inch (usual distance) in front of the eye increases the retinal images in size one and one-third times. By this one factor alone, then, the images of Jaeger No. 1 would be increased in size until they equaled (for the unoperated eye) Jaeger No. 2, or a little larger. Second, to the narrowing of the pupil. Where no iridectomy is done, this is due to contraction of the iris as the result of convergence and an effort at accommodation; where an iridectomy is done to a partial filling up of the pupil by membrane, except the central opening. It is a well-known fact that if the pupil is narrowed from any cause such narrowing acts as a diaphragm to cut off the peripheral rays of light entering the eye, and serves in this way to lessen the dispersion circles. Third, to the extraordinary acuteness of vision present sometimes after cataract extraction, e. g., as happened in one of my cases, where it was 20/10, double the ordinary acuteness of vision. I believe this fact contributed largely to the

power of interpretation present in this case; for he had an iridectomy and a clear pupil. Fourth, in some cases, to the patient not looking directly thru the center of the glass, but slightly outside of the center, either by tilting the glasses, tilting his head, or not holding the reading matter directly in front of him. In my opinion, this fourth factor in effect, a slight tilting of the strong plus glasses, assists the individual in interpreting dispersion circles chiefly by neutralizing the monochromatic aberration present in such cases. This is a point which no writer has hitherto called attention to in discussing this subject. Wm. Harkness³ has

shown that, "with a pupil four millimetres in diameter, the normal cornea produces monochromatic aberration to the extent of $1/33$; and as there is no confusion of images in the normal eye, it seems probable that the crystalline lens exerts some compensating action. This suspicion is strengthened by the well-known fact that in aphakia the acuteness of vision is nearly always improved by giving a certain inclination to the powerful convex glasses which are then necessary³." Furthermore, this very fact of monochromatic aberration in the lenseless eye, to my mind, renders Donders' light-point test more or less unreliable.

REFERENCES.

1. Manhattan Eye and Ear Hospital Reports, Jan., 1895.
2. Donders: Accommodation and Refraction of the Eye, p. 318, 320, 321.
3. Harkness, W. Archives of Ophthalmology, v. 12, p. 18.

NOTES, CASES AND INSTRUMENTS

ASSISTANTS IN SMITH'S CATARACT OPERATION.

MAJOR A. E. J. LISTER, M.B., B.S., LONDON, F.R.C.S., ENGLAND. I.M.S.
LUCKNOW, INDIA.

It is, I think, urged with justice that one of the drawbacks to Smith's operation for the intracapsular extraction of cataract is that it requires a very highly trained and experienced assistant for its safe performance. I agree fully with this opinion, as the result of my own experience. Some three and a half years ago my house surgeon fell ill in the height of the cataract season. I was, therefore, forced to devise a method of using less skilled men, as I had no time to train another man.

From practical experience in assisting at Smith's operation I knew the only real difficulty was to control the orbicularis muscle with the third and fourth fingers, while at the same time with the thumb and first finger holding up the lid with the strabismus hook. It is quite a simple matter to do either of these duties separately, the difficulty lies in doing them at the same time.

I therefore determined to use two men, one for each of these duties. I had available two men called compounders, who in India dispense medicine and help in dressing cases.

I made one control the orbicularis muscle with his thumb; for the right eye the thumb of the assistant's left hand is used, his arm being extended at full length, so as to remove his body out of the way of the operator. For the left eye the right thumb is used in a similar manner.

The other assistant finds it very easy to hold up the upper lid with the right hand and with the left hand to slightly pull down the lower lid. As the eyelids and eyebrow are wet the thumbs and fingers of both assistants should be well dried after sterilization, to allow them to grip more firmly. I regard this as a point of some importance.

I always allow them to do this on the far edge of the sterilized towel which I place over the patient's head. This portion of the towel does not come into the field of operation and if the operator makes a practice of presenting this corner to the assistant before he places

it over the patient's head, it serves as a reminder to the assistant. It ensures the use of a perfectly sterile towel each time, altho only one is required for each operation, a consideration, if there are a large number of operations, as in India.

I find a small piece of sterilized cotton wool placed under the thumb of the left hand of the assistant who is controlling the lower lid, gives a firmer hold and prevents slipping upwards of the lid if the patient strains.

The assistants can learn their duties in a very short time, whereas it takes a long time to train a single assistant.

At first the use of two assistants may seem complicated to an onlooker, and they may appear to be in the operator's way, but if anyone will try this method in a simple iridectomy case first, to get accustomed to it under easy conditions, I am sure he will not care to go back to the old method. Apart from the fact that the old method is no better, if as good, it makes him dependent on the presence of a single person. If this person is absent he cannot do an operation in safety or comfort. If either of the two assistants be absent anyone can place his thumb on the orbicularis muscle and the operation can be done in comfort.

In Europe and America, where the assistant is usually a house surgeon, whose tenure of office is generally a year, and the number of operations for cataract not very large, there is not time to train a man properly during his term of office. A man can learn to assist with safety after a few operations by this method. The advantage of this will appeal to all practical surgeons.

I have now used this method for two and a half years and I prefer it to the older method of using only one assistant, as described by Colonel Smith in his book and other writings. I know from personal experience as an assistant and from painful experience as an operator, that in a very bad patient in which the operation is sometimes necessarily prolonged, the fingers of the assistant get a little tired and the firmness of their grasp relaxes. This

allows the orbicularis muscle to act and escape of vitreous may result. By this method the assistant can control the orbicularis muscle and hold up the upper lid quite steadily for a long time.

I have used this method also in capsulotomy operations in bad patients with great advantage.

I have seen what are called bad patients on the operating table in England and on the continent, but I have never seen anything to even approach a really bad Indian patient. Some European writers have written about the docile Indian patient. In my part of India these are few and some of them are so bad that I cannot imagine anything worse.

I can therefore confidently recommend this proceeding. Many surgeons who have visited my clinic and seen this method in use have expressed the opinion that it is a valuable one, and in their opinion removes one of the chief drawbacks to Smith's operation.

The assistants change their duties daily. This keeps both in practice. If one happens not to be able to come, a nurse can control the orbicularis muscle quite well. I, however, usually teach my theatre nurse how to do this as well as the usual assistants, so that I may have her to fall back on, if required. Letting her do it once or twice is quite enough to make her efficient.

In my opinion, in spite of the many other appliances which have been advocated, the use of the strabismus hook for lifting up the upper lid has the great advantage, that it does not take up much room. A very essential point, especially in some cases. In the method I advocate, if one wants a little more room at one side, when replacing the iris, it is a very simple matter for the operator himself to adjust the hook in such a way as to give this. The assistant soon learns to allow him to do this, and when the hook is in the desired position, he lifts it up a little, which gives a good exposure of the upper surface of the globe.

A good assistant will do this himself but it is a great advantage to be able to do this one's self, if he does not see what is required.

TESTS FOR DETERMINING THE SIGHTING EYE.

CAPTAIN PERC. DOLMAN, M.C.

Research Laboratory, Mineola, N. Y.

There is considerable literature devoted to the subject of the sighting eye, but reference to specific tests for determining which eye is habitually used for sighting are difficult to find. This is probably explained by the fact that the act of sighting or aligning two objects is such a common experience in life that tests may easily be borrowed from this source. Few of these tests, however, meet the exact requirements of research work.

The possible coordination between the sighting eye and right- or left-handedness must be considered in selecting a test. Serious attempts have been made to establish this association between the dominant eye and the dominant hand in spite of the fact that no anatomic relation can be demonstrated. Until our knowledge on the subject is increased by scientific experiment, the possible influence of either hand should be eliminated from the adopted procedure. Tests made by pointing with either forefinger or with a pencil held in either hand or by sighting thru a ring held in either hand are open to criticism for this reason.

In another form of test the observer approaches a stationary object such as a vertical rod and aligns it with another object located some distance away. This procedure is free from the influence of either hand but it frequently happens that, in walking toward the first object, the nonsighting eye is carried in line with the two test objects by a mere accident of head position. Such a test is unnecessarily inconvenient in addition to being unreliable.

During a recent investigation of the influence of fixation on the measurement of heterophoria, on the relation of the sighting eye to the measurement of heterophoria, it was necessary to test each observer for his sighting eye. Experiments were made with various tests and a conclusion reached that the possible influence of either hand would be greatly reduced by holding the first test object in both hands. A 13x20 cm. card with a 3 cm. round hole in the center was employed instead of the customary pencil or pointer. The use of such a card compels the selection of one or the other eye for sighting thru the hole, thus eliminating a certain percentage of negative results which are obtained when the first and second test objects are aligned with some point between the two eyes.

The test is performed by having the observer grasp the short ends of the card with both hands and raise it slowly at arm's length while looking intently at a spot of light six meters distant. He is instructed to keep both eyes open and locate the light thru the hole in the card. The eye selected for this purpose is the sighting eye.

This test has been made repeatedly on the same observers with intervals of several days between trials. The eye that was selected the first time, whether the right or left, was invariably selected at the later tests.

The apparatus required for the test just described is both simple and convenient. It does not permit the selection of a sighting point situated between the two eyes but forces the use of one or the other eye for the act of sighting. The possible influence of the right or left hand on the test is greatly lessened by having the card held in both hands. The results obtained with it are consistent in repeated trials with the same individual.

SOCIETY PROCEEDINGS

AMERICAN OPHTHALMOLOGICAL SOCIETY.

FIFTY-FIFTH ANNUAL MEETING

Atlantic City, June 14-17, 1919

President, DR. LUCIEN HOWE, of Buffalo.

(Concluded from page 763.)

Lethargic Encephalitis.

DR. HIRAM WOODS, Baltimore, reported six cases in which the diagnosis of this curious disease seemed justified. A seventh case was included because of the characteristic eye disturbances and negative pathologic findings on thoro study. Lethargy, however, was not present to any extent. The case was the only one which terminated fatally, apparently thru involvement of the respiratory centers. Autopsy was not allowed.

Of the six cases, lethargy was the first symptom in three. This was soon followed by ocular disturbances. In three the eyes were first affected. Eye symptoms divide themselves into two classes: (1) Those without paralysis, but showing curious spasmodic movements of certain muscles when others were called into action. (2) More or less complete ocular palsies. These included ptosis, convergence, pupillary action, accommodation, inferior recti, and a transient paralysis of the externus in one case. The nuclei of the third nerves seem the points of most frequent attack. In but one case was there optic neuritis.

Recovery was slow; indeed, after two or three months some of the patients were not well. Apparently this disease is not well understood; and it is especially likely to come under the observation of the ophthalmologist.

DISCUSSION.—Dr. Arthur J. Bedell, Albany, N. Y.—Dr. Woods' paper has been of much interest to me for, during the past six months, it has been my privilege to see forty-eight cases of lethargic encephalitis. The variation in the severity of symptoms is one of the most marked features of the disease and doubtless many of the mild cases have either passed unrecognized by

physicians or even without medical advice.

Three more or less distinct types have been clinically noted in my cases. The mildest characterized by sudden diplopia often so transitory and slight that before all serologic tests were completed marked improvement or recovery had been reported. On examination, these showed a rapid nystagmus, usually lateral but the vertical not uncommon. There was a tendency to convergence, with sixth nerve paralysis, headache and the usual sense of insecurity.

The next severer type had diplopia practically for all distances, the general discomfort such as headache and mental depression greater, the nystagmus more marked and usually accompanied by other nerve pareses such as the third, fourth, eighth, ninth, tenth and eleventh nerves. The duration is longer and in some of my cases the mental side was so great that the patients were unfit for work, and two of them were confined to institutions of detention.

The severest type is illustrated by a case, first seen by me, in a sleeping state, having given a history of progressive somnolence with diplopia. The sleepiness progressed and despite all treatment, the patient died. Autopsy revealed the findings considered characteristic in this disease.

The clinical condition of lethargic encephalitis is more commonly recognized by the ophthalmologist and it is proper that Dr. Woods' paper be given prominence.

Dr. G. E. de Schweinitz, Philadelphia. I have had the opportunity of seeing a number of ocular complications in connection with so-called lethargic encephalitis. All had the lethargic and somnolent stages; but in all, the first ophthalmic symptom was diplopia. Mostly the only muscle affected was the external rectus. There was one case in which, I believe, the muscle affected was the superior oblique. Then there were a few cases in which oculomotor palsy, with ptosis, was the ocular phenomenon. In all these cases,

one of which I have studied since the onset of the somnolent stage, there has been a marked impairment of accommodation.

The third group is a very severe one, in which there is practically complete ophthalmoplegia externa. The most of the cases occurred in one of our camps, some of these cases proving fatal, and some being in the process of recovery. They formed part of a report not yet liberated from the Surgeon General's Office.

Dr. E. A. Shumway, Philadelphia. I have seen, during the past winter, six cases of lethargic encephalitis, three in private work, one with Dr. Spiller, one in the University Dispensary, and one in the Lankenau Dispensary. In four, the sixth nerve was involved alone. One had the oculomotor affected with the sixth; and later the lower centers became affected, and death occurred, apparently from sympathetic failure caused by involvement of the medulla. One had fourth nerve paralysis, and then the oculomotor became involved; then the sixth and seventh nerves; and then there was respiratory failure.

One case was seen with Dr. Spiller. We thought that death would ensue, but he has recovered, and is nearly normal, except for his mental condition. He showed marked lethargy. One was a fatal case, in which the patient could be aroused only with difficulty. One was in a stupid condition, which seems characteristic of some cases. He could be aroused, and would answer questions properly; but would immediately lapse into the same condition again. If left alone, he would have a muttering delirium, and talk to himself; and if spoken to, would arouse and answer questions. The delirium persisted for weeks, until he recovered. He is practically normal now, but has no confidence in himself and does not feel that he can go on with his work.

In one case with optic neuritis, death ensued, but no autopsy was permitted. This case occurred in the Lankenau Hospital. In four cases, there was a definite history of influenza. One was the fatal case. One was complicated

with positive Wassermann findings, and an increase in the cell count in the spinal cord. These symptoms had appeared very suddenly, and Dr. Spiller, who saw the patient, thought that the case could be considered as of the lethargic encephalitis type. He recovered, and his oculomotor palsy disappeared; and, with the exception of weakened accommodation, the ocular condition has cleared up.

At a meeting of the Philadelphia Neurological Society this spring, Dr. Spiller reported, in addition to two of these included among my cases, one other case; and two fatal cases were reported, one from the Philadelphia Hospital, in which typical autopsy findings were obtained; increase in the cells around the blood vessels, and hemorrhage around the nuclei in the bulbofrontal region.

Dr. Spiller at one time felt that the influenza should be very strongly considered as a cause of these cases. It was not definitely positive in all cases; but he felt that it might be considered, as the infection from the toxin of influenza affecting the cord and brain, rather than localizing itself in the respiratory centers or the intestinal tract.

Dr. T. B. Holloway, Philadelphia: I think that Dr. Shumway, in referring to what Dr. Spiller had said, has hit upon one of the affections from which it is difficult to differentiate the milder forms of this condition. It is almost impossible to wholly eliminate influenza as a possible source of confusion in these cases, unless we include it as an important factor in the production of this condition. It is by no means an easy matter to differentiate mild specific cases. The diplopia fields are also difficult to work out, especially if the patient has a partial ptosis which may increase during examination.

Dr. Hiram Woods, Baltimore. What Dr. Holloway says about the diagnosis is undoubtedly true. My last case was in a young man who had been in good health all his life, but who developed a facial neuralgia on the right side. That was followed, in a week, by right ptosis; then by paralysis of the oculo-

motor nerve; then by a paralysis of the left external rectus. Vision was normal. The intrinsic muscles were spared. That man was sent to the hospital, and all possible examinations made. The results were typical of the general findings, but the patient died of respiratory paralysis. A few days before his death, we discovered some little nodules, barely palpable, on the scalp. One was excised; and after examination, it was found to be a leucosarcoma. The question is, Did he have this disease, or a sudden metastasis of an absolutely malignant growth? An autopsy was not allowed.

A telephone operator suddenly saw double. She went to see a retired oculist, and he found a decided left internal squint. He put atropin in her eyes; and when she came to see me, a day later, she had complete cycloplegia. Her refraction was measured. She had an internal squint, a partial paralysis of the external rectus, and a complete atropin cycloplegia. That occurred the second of March. She still had a maximum accommodation of only 2 to $2\frac{1}{2}$ diopters. The thing cleared up. The way the diagnosis was made was that she went home from my office and slept continuously for ten days. Then they woke her up and brought her to see me; and I found that the accommodation was paralyzed still. She went home and slept for another ten days. Nearly three months afterwards, she still has only a very low range of accommodation.

Coloboma and Congenital Dislocation of Lens.

DR. C. F. CLARK, Columbus, Ohio, reported the farther history of a case of coloboma described by him in 1894. This patient had shown little increase in myopia, but decided increase of astigmatism. His lenses remained clear but he showed slight evidence of early presbyopia before his death at the age of 34. In a case of dislocation of the lens then reported, there was myopia and a modification of the astigmatism apparently due to tilting of the lens. The cases of this kind encountered in

35 years numbered 11, of which 8 showed coloboma, and 4 dislocation, one patient showing both conditions.

Seven cases occurred in the children and grandchildren of one man, who was probably similarly affected, and his father also.

It seemed remarkable that in some of these cases of coloboma, where as much as one-third of the suspensory ligament seemed to be absent, there was good power of accommodation. In one case of dislocated lens, R. + 18. sph. \ominus 1 cyl., and L. + 18.5 sph. gave standard distant vision, and with same glasses the patient read small print.

DISCUSSION.—Dr. W. E. Lambert, New York. In two cases in which I have operated by excision of the lens, the visual result has been most excellent; and in all the background of the eye has been normal. One of these children, a girl of ten, had such poor vision that it prevented her from attending school; and for that reason, operation was decided on. The mother had a luxation of the lens, but so slight that it did not interfere with vision. Both of these children were needled. The visual result in the girl was 30/40 plus, in one eye; and 20/50 in the other. In the boy, the operative results seemed less favorable. In all these children, the phenomenon that Dr. Clark alludes to, of being able to use the same lenses for near as gave them this distant vision was noted. They were unable to read comfortably, and apparently had some interference with accommodation.

Dr. A. Edward Davis, New York. I wish to relate a remarkable case of this kind. The girl was eight or nine years old. It was interesting to observe the suspensory ligaments in that case, when she made efforts at accommodation; and also the shortening of the diameter of the lens. We gave her glasses. I have had her under observation for fifteen years. The lens is luxated upward and backward. The patient's vision has been gradually reduced, on account of cataract formation. I think that the accommodative power in some of these cases is good, I believe even up to the normal.

Dr. Lucien Howe, Buffalo. These cases seem to have three very interesting features; the questions that arise physically; the question of the treatment; and the particular interest of this group from the hereditary standpoint. The last is a phase of the subject the importance of which is just dawning on us. When defects of vision are transmissible and pertain to eugenics, and are of the dominant, instead of the recessive type, it is our business as ophthalmologists not simply to report them here to one another, but to attempt to evolve some method of procedure that we may recommend to our confreres, and to the Legislature if necessary, as to what shall be done in regard to this matter. Which are the characters that are dominant, and will be transmitted, which we should do something about; and which characters are of the recessive type, and do not interest us particularly? It is for us to express an opinion, if necessary a collective opinion, so that it may have some effect on the community and coming generations.

Dr. E. V. L. Brown, Chicago. In regard to the transmission of these defects, important work is being carried on at the University of Wisconsin. The triturated lens from the wild albino rabbit is introduced into the blood of roosters, thereby sensitizing the fowl's blood to the lens of the rabbit. Then this blood is reinjected into the rabbits, and has in a number of cases produced coloboma of the iris, and opacities of the lens. At first, the investigator got few results; but when he introduced the blood into the pregnant female and into litters in various stages of development, he produced these changes. In some cases, he carried these changes on, generation after generation.

Dr. C. F. Clark, Columbus, Ohio. So far as the operative work is concerned, I did not go into the question of coloboma and dislocation with reference to that point of view. What I was interested in was this refraction problem, in the cases that have retained clear enough lenses to enable us to follow them thru a period of years.

Ocular Anomalies of Development.

Dr. WILLIAM ZENTMAYER, of Philadelphia reported a case of multiple dermoids, there being bilateral sclerocorneal dermoids and a dermoid of the right cornea. There were also supernumerary tragi and macrostomia. The patient was female, and the various operations required for cosmetic purposes were described.

Retinal Tuberculosis.

The paper of Drs. Edward Jackson and Wm. C. Finnoff has been published in full, p. 715.

DISCUSSION. — Dr. Arnold Knapp, New York. I have been very much interested in this subject of retinal tuberculosis — periphlebitis, so called, and these cases bring up a number of questions I should like to ask in regard to the first case, how the writers explain the presence of the deep corneal lesions. It has always seemed to me characteristic of this process that the manifestations are in the anterior or posterior part of the eyes and if you have periphlebitis, you usually do not have lesions in the anterior part.

In the second case, if I understand correctly, the so called masclar figure developed. That has always been associated with an exudate into the retina, irrespective of the etiology. I should like to know whether an exudate was present in this case. In regard to the third case, which I had under my care at one time, I should like to ask Dr. Jackson as to whether he is optimistic about what he can accomplish by means of tuberculin treatment in preventing a recurrence of these hemorrhages.

Dr. C. D. Wescott, Chicago. I wish that, in closing the discussion, Dr. Jackson would tell us his present method of using tuberculin especially in cases in which he continues the treatment over so long a period of time as he has mentioned in one of these cases.

Dr. H. M. Langdon, Philadelphia. A girl, sixteen years of age, came complaining of blurring of vision in the left eye. On examination, she was found to have a very slight haze in the vit-

reous, with, in the lower temporal branch, about a disc diameter below the macula, and about half the size of the disc, a well defined patch of exudate. She had been apparently in perfect health, but physical examination proved that she had a well advanced apex tuberculosis, as proved by the tuberculin reaction, temperature study, physical examination and the x-ray. On account of the lung involvement, it was deemed unwise, for the time being, to use tuberculin; and she was placed on the ordinary hygienic measures proper in such a condition. With these, in six weeks the ocular condition entirely cleared up, leaving nothing but a small, poorly defined scar in the retina. Vision was 6/5. Some cures that we attribute to tuberculin may not be due to this, but to the systemic measures taken, as well as the systemic reaction produced by the tuberculin.

Dr. Edward Jackson, Denver. The third case, as Dr. Knapp correctly surmised, was a case he had seen and in which I think, he first instituted tuberculin treatment. That man has apparently recovered. He was under a pretty strict regimen when he first came to Colorado, that has been gradually relaxed. After a time he was allowed to play tennis and take walks, and gradually play longer and walk greater distances. Then he was permitted to resume his studies. Finally, a few weeks ago, the question came up as to whether he could come East for about six weeks, to complete his studies to enter the priesthood. I advised him strongly against it. I said that while he was relatively in good health, his continuance in good health remained dependent upon his observing the conditions under which he had attained it.

This brings up the matter of the value of tuberculin in these cases. As will be noted, we concluded that the regimen, the life, or the general treatment of tuberculosis should be observed in every case; but that tuberculin should be reserved for those cases that are free from decided temperature changes. A variable temperature curve, dropping each day below normal, tho not going much above

it, may have the same significance as a distinct daily rise in the temperature. To those that are free from this, and have no large active tuberculous lesion, it is wise to give the 1:100,000 or 1:500,000 of a milligram of old tuberculin. But this treatment is not applicable to a patient with large tuberculous deposits. When the patient is free from them, the cases I have been able to follow have given the impression that the ocular lesions did better and came to a final cure under tuberculin, when they would not without it. The tendency to relapse is the final test of a relative cure that is brought about by tuberculin.

With reference to the method of administration, I have had the assistance of an internist in all these cases that I have reported. Dr. C. N. Meader saw the cases that I referred to today. I am certain of the importance of small doses at long intervals. One of these cases began the therapeutic use of 1/500,000 of a milligram, repeated at intervals of a week. Another case was getting a somewhat larger dose; but in that case, when the dose was raised to 1/10,000 of a milligram, or more than that, he seemed to do rather badly. The interval was lengthened, and the dose dropped back.

In the present state of our knowledge, the use of tuberculin is experimental, and every case should be watched as an experiment. But the things that stand out most clearly in my mind are that the doses should be small (not to give a trace of a reaction is better than to give a big reaction), and that the intervals should be long. Tuberculin, if it does good, does it by starting a certain reaction in the system; and until that reaction has time to occur and be complete, the dose should not be repeated.

With reference to the question of the corneal lesion; this is the only case that I have seen in which there were distinct lesions in the anterior segment that were followed by retinal tuberculosis. But in this case, the connection seemed pretty definite. I have seen in one other case marked vitreous exudates entirely free from any con-

nection with the retina, there being apparently no diseased tissue between them and the retina. They were far forward in the vitreous. I suspected that in that case there had been lesions in the anterior segment.

Subretinal Exudate Resembling Sarcoma of Choroid.

DR. ARNOLD KNAPP, New York, reported a case of this character in which the diagnosis was cleared up by anatomic examination of the enucleated eyeball.

The patient, male, aged 71 years, presented a sharply defined mass in the macular region, dull white in color, with some mottling, and an elevation of 3 D. In the absence of inflammatory or vascular changes in the eye-ground, the diagnosis of sarcoma of the choroid was made and the eye enucleated.

The microscopic examination showed a subretinal mass of organized connective tissue between the choroid and retina. The choroidal and retinal vessels were normal.

The case chiefly resembles the type described by Coats as retinitis with massive exudation, except that the swelling occurred in the macular region in a patient of advanced years and with no vascular changes.

The other eye subsequently developed central chorioretinal changes consisting in deep retinal hemorrhages, pigmentation, atrophy of retina, superficial atrophy of choroid, and changes in the choroidal vessels.

DISCUSSION.—Dr. F. H. Verhoeff, Boston. I have recently examined an eye from a case similar to this. I feel sure that this tissue is produced by the pigment epithelium. The so-called chorioretinitis is due to changes in the pigment epithelium, and do doubt, caused by arteriosclerosis. It is a hyperplasia of the pigment epithelium. While I have seen pigment epithelium in other parts of the retina, I do not recall having seen it here before; but I think that Dr. Knapp is undoubtedly correct in thinking that it is due to some changes caused by arteriosclerosis; and the fact that the other patient had senile chorioretinitis substantiates it.

Dr. Edward Jackson, Denver. I recall a case in which, on the first examination of a tumor of the choroid at the macula I made a probable diagnosis of sarcoma. The swelling was $1\frac{1}{2}$ or 2 diopters, and pretty sharply limited at its margins. There was a history of central scotoma going on for several weeks. There was a negative Wassermann, but the patient was put on potassium iodid; and in the course of three or four weeks, the edge of the tumor was distinctly less abrupt. This went on; and within four to six months, all symptoms of a tumor in that region had disappeared.

Choroiditis from Sinus Disease.

DR. JOHN E. WEEKS, New York, reported two cases of a typical disseminated choroiditis, due to disease of the nasal accessory sinuses. The first was that of a man seen in 1908. Three years before the right eye had become affected and now the left was involved. There was no history of nasal disease. The fields of vision were contracted, and R. showed a central scotoma. The choroidal exudate occupied a circular area.

In 1917 acute glaucoma set in. Under myotics the vision of the left eye was brought up from 14/200 to 20/90. X-ray examination showed the sinuses all cloudy. May 20th, 1918, a new attack of glaucoma occurred. A Langer operation was done and the antrum and ethmoid were opened. After this the eyes became clear of inflammation and vision rose to 20/20. At one time symptoms of a recurrence had arisen after blocking of the ethmoids.

The second case was that of a man aged 29 seen this year. There were patches of choroidal inflammation and vision was reduced to R. 20/200, L. 20/30. The X-ray showed the ethmoids and sphenoids cloudy. These were opened and found to contain many polypi. Drainage was followed by prompt recovery.

Visual Acuity at Low Illumination.

PROF. C. E. FERRÉE, of Bryn Mawr College, presented a lantern for testing vision by exact illumination and read

a paper which will be published in full in this Journal.

Radium Treatment for Tumors.

DRS. GEO. E. BELL and SINCLAIR TOUSEY, of New York, reported a case in which a tumor of the orbit extended on to the brow, and it had followed trauma. The eyeball had been pushed out of the orbit. The application of 20 mg. of radium bromid was continued one hour and repeated every two weeks from Dec. 19th to April 1st. At first 5 tubes were used, but after the shrinking of the tumor was well started only two. The growth shrivelled, and an apparent cure was the result.

Discussing radium as a therapeutic agent, and its value in malignant and nonmalignant tumors of the orbit, they concluded that it should be used in all nonoperable cases. It should also be seriously considered in the treatment of intraocular tumors. The therapeutic value of radium is now well established, altho it is not used by ophthalmic surgeons so often as might be expected.

DISCUSSION.—Dr. T. B. Holloway, Philadelphia: Dr. Bell has referred to the use of radium prior to operations on tumors of the orbit. I think that much would depend on whether the orbit is the primary seat of the growth or whether it has been encroached upon from neighboring structures. To my mind, radium may well supplement operative procedures, probably better than operative procedures may supplement radium, in certain types of tumor formation. You may recall that I reported, some years ago, the history of a case of sarcoma with bilateral orbital involvement, in which, immediately after the operation, radium was packed into the orbit with the primary dressing, 25 milligrams being allowed to remain for eight hours. That procedure has been used in another case, which was inoperable and where adjacent structures were involved. The patient was under treatment by Dr. Pancoast; and I think the treatment prolonged the patient's life, altho the result was inevitable. Since then, radium was

used in another patient who had an inoperable carcinoma involving the temporal region. At times evisceration of the globe may seem preferable to evisceration of the orbit. Such was the case with this patient, but local applications of radium interspersed with X-ray treatment, was kept up in all the cases I have referred to except the infant with bilateral sarcoma.

I have another patient, an Italian, observed three years ago, whose history I have already reported. The growth in this instance was an epithelioma of the lids which had involved the orbit. In this case, excellent results were obtained by the application of radium after curettage and evisceration of the orbit.

Dr. F. C. Clark, Columbus. Five or six years ago, I ventured to use radium in an orbital growth in which I was making an exploratory incision. On examination, it proved to be a vascular growth; a mass of enlarged vessels in the apex of the orbit. The patient was a child of 2½ years. This was before the use of radium had been so well developed as it is now. I opened, to have access for a small tube; and I used it without protection around the tube.

I did a canthotomy, and detached the external rectus; and, by means of a speculum, obtained a fair view of the orbit. Finding this condition, a surgeon near at hand passed the radium over, and let me use his tube. I embedded it, and left it in for two or three hours, and then removed it. A few days later, I repeated the process. I had excellent results, and the eye receded. The eye was one that already had no vision, so it made no special difference, but he developed a zonular cataract. I should like those who can, to tell us what experiences they have had in that respect; and whether, in using radium for this purpose, we could guard ourselves against this accident.

Dr. Robert S. Lamb, Washington. I have had no experience with radium that has been completely satisfactory. I have been relying on the X-ray to supplement operative procedure. It seems that we can operate on almost

any tumors, even if we are unable to control the cosmetic effect. We can operate on tumors that are very extensive, by using the knife cautery outlining the mass, and going into the orbit.

Dr. Dunbar Roy, Atlanta. I should like to ask Dr. Bell what was the duration of the treatment.

Dr. Derrick T. Vail, Cincinnati. Mr. F. M. D., aged eighty-four years, came to me ten years ago on account of slight exophthalmos of the right eye, associated with ophthalmoplegia externa. He also had some complications in the eye, like cataract formation; and the vision in each eye was very much below par. In the affected eye, it was reduced to 21/100. He had never possessed robust health. I saw him from time to time, and this growth continued. It seemed to be in the orbit, behind the eyeball. The ptosis continued; the ophthalmoplegia persisted. Last September, he came in, presenting a very sad picture. He was very senile physically, but mentally very bright, and capable of enjoying life, and was desirous of being relieved of the tumor, which was very conspicuous. He was having no pain, but had come to find out what I could suggest. I advised him to go to Johns Hopkins and try the radium treatment. He went; and I did not see him until February, when he came with the mass entirely gone. The growth of the orbit had enlarged the orbital confines until it was one-third larger than the other. This permitted the eye to fall back, so that there was a suggestion of enophthalmos. The eye, which had been blind for a long while, had perception of light. Having received a demonstration of what radium is able to do in a case of this kind, I should try it in another instance. I do not know the character of the growth, but it had persisted ten years. The cure was complete.

I believe, however, that this treatment is not so desirable for cases of glioma. If the glioma can be diagnosed before it has produced increased tension, I think that it would be better to

enucleate the eye than to try to cure it with radium.

Dr. George H. Bell, New York. In regard to what Dr. Holloway stated, I think it is better to use radium first. Then, sometimes, you will not have to operate at all. Try the radium again, after the operation, if an operation is necessary.

In regard to Dr. Clark's remark, so far, we have not got any cataract from the treatment of the tumors with radium.

Replying to Dr. Roy's question, I saw the woman eight months ago, and she was feeling fine.

Dr. Vail's case is very interesting and encouraging to all of us who are interested in radium. Dr. Tousey has got some wonderful results with it, and thinks that all these tumors can be absorbed by the use of radium.

Tuberculin Reaction in Sarcoma.

Dr. J. W. CHARLES reported the case of a man aged 24 years who gave the history of a burn of the right eye 8 years before. Deep seated ocular pain developed 5 years later. When first seen the eye presented exclusion of the pupil, cataract, ciliary staphyloma over the upper portion of the eye, and a small nodular swelling on the sclera in the lower inner quadrant. The Wassermann reaction was negative; but the eye gave a positive focal reaction to tuberculin. The eye was enucleated and the diagnosis made of spindle-cell sarcoma which had perforated the sclera.

Intraocular Tumor.

Dr. HOWARD F. HANSELL, Philadelphia, presented a clinical and pathologic report of a case of intraocular tumor.

At the first examination the retina was totally detached from the choroid. No signs of intraocular inflammation, no pain, tenderness or injection, or history of traumatism. Gradual increase of tension and shallowness of anterior chamber; dilatation and immobility of pupil developed. Enucleation and implantation of a gold sphere were done. It proved to be a choroidal growth.

Epithelioma of Eyeball and Lids.

DR. DUNBAR ROY, Atlanta, reported two cases treated by removal in which there was no return after six years.

Case 1. W. A. F., farmer, aged fifty-four years. Seen in June, 1908. Inflammatory irritation of the left eye. At the sclerocorneal margin there was a gelatinous mass. Section of the same showed epithelioma. V. = 20/50. The growth was thoroughly removed and the base cauterized. Eight months later return with infiltration of conjunctiva. The eye was enucleated. Three weeks later, on account of the suspicious appearance of a remnant of conjunctiva, the orbital contents were eviscerated. Healing by granulation. Eleven years later the cavity is smooth and there are no signs of recurrence.

Case 2. Mrs. J. W. W., aged thirty-three years. Epithelioma at the inner canthus of the right eye. Treated for months by a dermatologist. Operation of evisceration of the whole orbital contents with upper and lower lids. Healing by granulation. Six years since operation, no signs of a return.

DISCUSSION.—Dr. R. S. Lamb, Washington. Prior to seven years ago, I used to cut first, and then use the X-ray. Since then, I have used the X-ray a short time before the operation. Sometimes I use it to relieve the excruciating pain, and then operate within twenty-four hours. I have used the X-ray prior to operation, also, to close the lymphatics and prevent the tumor from spreading in metastasis. At the time of the operation (stopping the ether long enough to do the work) I have taken the cautery knife and separated the tumor, after exenteration from the healthy tissue.

In cases of glioma in which extension has not gone beyond the globe and is not anterior to the equator, I find that enucleation with one-half or three-fourths of an inch backward on the nerve, and cauterizing the area from the sheath, is sufficient. I have had no recurrences in these cases.

Three weeks after the first X-ray, which was several days before operation, there is another treatment given; and so on for six months, every three

weeks. After that, the treatments are given at intervals of six weeks.

Dr. Clarence A. Veasey, Spokane. In connection with this paper of Dr. Roy's on epibulbar epithelioma, I should like to exhibit the photographs of a case that is somewhat unusual, recently seen and recently operated on. This patient had apparently always been in good health. His age was fifty-six. Many years before, he had observed a small pigment spot on the sclera; to the temporal side, to which he paid no attention. For two or three years, it had been increasing in size; and by the time I saw it, the anterior segment of the eyeball was covered, and over it, the growth was roughened and covered with a crust, evidently ulceration.

Although the patient lived within a few hours travel of many ophthalmic surgeons, he had consulted no one until he appeared for operation; yet the small spot had been observed in childhood.

Dr. C. H. May, New York. It may be of interest to report a case similar to that of Dr. Charles, in which there was a decided focal reaction in a patient who had a tumor. A child three years old was admitted to the hospital; and a small dose of tuberculin was given which caused a violent reaction. The dose was exceedingly small, as it is known that children react very easily to tuberculin. The child's eye presented a dirty, yellowish exudate covering the pupillary space and the iris. Tension, normal or diminished. The child's physique gave one the impression of tuberculosis. Tuberculin was used in increasing doses for two or three months, and the result seemed good. The exudate cleared up; the details of the iris became visible; the pupil could be seen.

There were, at times, violent reactions to the tuberculin; but these were ascribed to the fact that children are very susceptible to tuberculin. There was no question in the minds of the men watching the case that it was one of tuberculosis.

At the end of three months, there was a violent reaction, which was at-

tributed to the possibility that one of the internes had made a mistake in the amount to be injected. Following this, there was increase of tension. The eye became red and sore; and it was concluded that since there was probably no sight there, it would be better to enucleate the eyeball. At operation, it was found to be a case of glioma; and the growth had extended beyond the optic nerve. I have no doubt that the case went on to a fatal termination. In that case, the positive reaction presented to tuberculin misled me and prevented me from adopting enucleation, which might have saved the child's life.

Dr. C. F. Clark, Columbus. Early recognition of the exact character of an intraocular tumor, is of the utmost importance. I think that Dr. Hansell said that early enucleation does not prevent metastasis. I should like to know whether he really means that. I have under observation a case of melanosa sarcoma which will illustrate my point. The patient has been under observation for a long time. We used radium, with little effect; and I removed the eye as soon as I felt sure that I was dealing with a serious growth. But I was not positive until the patient came to me with beginning enlargement of the eyeball, of which there was no indication a few weeks before. I immediately enucleated the eye. The patient is a young lady; and there is no hope for her, if Dr. Hansell's statement is correct.

I have several eyes with sarcoma of the choroid, removed after they had attained the size of half a marble; and I have seen the patients six or seven years afterwards, with no metastases.

Dr. Hiram Woods, Baltimore. There are two points in Dr. Hansell's paper to which I should like to draw attention. One is as to the value of transillumination. Some time ago, I saw a child about five years old, who presented what was clinically a glioma of the retina; and there was no history of former inflammation—no clinical evidence of a uveitis. The transillumination was taken in a dark room, but when we reached the area of this

growth (it was well forward, and there was no possible reason why we should not see it correctly), everything became dark in the pupil; and yet, when the eye was enucleated, it proved to be nothing but an inflammatory mass. It would have cleared up. The whole thing had been due to some former inflammatory trouble, which could not have been brought out in the history.

My experience with metastasis is very limited; but I think that it is much more frequent than Dr. Hansell has seemed to indicate. I ask an expression of opinion on this general question: Given an eye in which transillumination is lost, and in which there are definite evidences of a sarcoma, but in which vision is left, what is the consensus of opinion as to the use for any length of time of radium, Roentgen rays, or anything else in the place of enucleation?

Dr. Wescott shakes his head, and I suppose he is right. He certainly is, according to my limited experience. But you have that question put to you. Dr. Harlan will recall a man who made the rounds in Baltimore, and everyone gave the same opinion concerning the case. He had a growth that caused loss of transillumination, but he had good vision. This is a primary question, and one that bothers us every time we see a case; and I should like some expression of opinion from the essayists, as well as others, as to whether their experience with radium, of which I have had none, shows that we have got to a point where we are justified in waiting any length of time after the diagnosis is made.

Dr. George F. Fiske, Chicago. Some years ago, I published a series of cases of tumors in the bulb, which were all melanosa sarcomas. Seven out of fourteen never recurred. The recurrence, when it did take place, was always a year after the operation. I believe in early enucleation, and that this is the thing to be done.

Dr. C. D. Wescott, Chicago. If I understand Dr. Hansell correctly, he said that he had not seen a metastasis. I want to congratulate him, because my experience has been so sad by

comparison. I have seen metastases that manifested themselves anywhere from a few months to seven years afterwards, and were proved by post-mortem to be metastases. I have reported before this society some cases of flat sarcoma in which the specimen showed that even in the presence of a very little tumor, tumor cells may pass thru the vascular channels entering the globe; and that we may have involvement of the extradural tissues when the tumor that we can see inside the eye is comparatively small. It has been my practice, as soon as I could satisfy myself that I had a malignant tumor in the eye, eliminating other things by the best means of diagnosis at command, to advise enucleation immediately; and if this is not consented to, to abandon the case. I have heard from a patient living fifteen years after the removal of a globe which contained a circumscribed, almost intraglobular sarcoma, as demonstrated by careful examination. So far as my knowledge goes, that is the only patient who has survived for that length of time in my experience of over thirty years.

The location of that tumor was almost at the equator of the globe. It was back of the ciliary body.

Dr. E. B. Heckel, Pittsburgh. Experience has taught me that with epibulbar growths it is best not to operate, but to try to remove the tumors by means of the X-rays. Their application has been difficult, on account of the length of exposure and the danger of burning and producing necrosis of the cornea. Some years ago it occurred to me to make exposures under constant irrigation with normal salt solution; and I reported this procedure in a case in which the cornea escaped and the eye was not injured in the slightest degree. The result was absolutely permanent; and the cure was perfect, and remained so for five years, after which the patient died from other causes.

Dr. Allen Greenwood, Boston. I am very glad to hear that Dr. Wescott recommends very early removal of these tumors; and I wish to justify Dr. Knapp's removal in the case that

he said gave all the appearances of a sarcoma of the choroid. He immediately enucleated; and we should all do the same thing.

My experience has been also rather a sad one. I have two cases in which the sarcoma was removed in the primary stage; and in both, the tumor, on examination, was found to be of very small size and situated in the equator. In one, it was only a little larger than a bean. Both patients were men. One, after five years, died of sarcoma of the liver; and the other died of the same complication after four years. With that experience, I cannot help feeling that the sooner sarcoma of the choroid is removed, the better for the patient; and no matter how early it is removed, there is the possibility of metastasis in the liver.

Dr. J. W. Charles, St. Louis: I was sorry that no one said anything about Coley's fluid. In St. Louis, our surgeons feel that they have had some distinct successes with it; and I cannot help feeling that in these days of X-ray and radium treatment, perhaps Coley's fluid has been neglected to some extent in sarcomata. When neither operation nor radium, nor the X-ray, will prevent recurrences, Coley's fluid will perhaps do some good, and I would strongly advise that it be tried.

In that connection. I would say that Dr. McAmis wrote me that he had a boy of nine years, who had had the orbit cleaned out, and apparently the entire growth removed. He had had a recurrence, however, and was put on Coley's fluid; and, five years later, was well. Another case of nasopharyngeal sarcoma, Dr. McAmis saw also. It had recurred after being operated on twice. He suggested Coley's fluid; and when the patient was seen, some months later, he had remained well.

Speaking of positive focal tuberculin reaction in sarcomata, it occurs to me that this might arise without the patient's having tuberculosis. I had never heard of it, and have found nothing in the literature about it; but Dr. Dunn, of Asheville, told me yesterday that he had seen a report of some cases

by someone in Leipsic, that had positive tuberculin reactions in sarcoma.

Dr. Howard F. Hansell, Philadelphia. With reference to the statement of Dr. Woods concerning transillumination, I would say that I am quite in accord with him, and believe that the explanation of the mistakes made (and I believe that they are often made, when one depends too much on transillumination) is that they are sometimes due to the absence of pigment. The shadow is more likely to be cast when there is a great deal of pigment. I do not place much confidence in the value of transillumination as a diagnostic means.

Dr. Clark was correct in saying that I made the statement that early enucleation will not prevent metastasis. I looked up the authorities, tho' I have not quoted any in my paper; and I found that they agree that forty to fifty per cent of tumors of the eyeball are metastatic, and that they quite agree that early enucleation will not prevent metastasis. It appears to me to be analogous to cases of syphilis, in which early excision of the primary sore will not prevent the general infection. These cases of tumor, however early discovered, must have existed long enough to permit of entrance of the germs, or whatever it may be that produces the growth, into the general system. I agree with all the speakers that early enucleation should be done; and that it is preferable, for fear metastasis may supervene. I believe that it is the best treatment, and is better than any treatment by which enucleation might be delayed. While the X-rays and radium may help to remove the tumor or to diminish it in size, the eye is usually blind and useless, and must be admitted to be a source of danger.

Dr. Dunbar Roy, Atlanta. While two or three cases are by no means a criterion on which to base a prognosis, I am convinced that when epibulbar epithelioma exists, and the diagnosis has been made clinically and microscopically, the best thing to do is to enucleate the eye and take all the suspected tissue possible, and then eviscerate the orbit in case the conjunctiva left is involved. I am convinced that you cannot remove radically an epi-

bulbar epithelioma, and have it stand a chance of remaining cured without extension.

I am satisfied that where you can reach the growth, the electrocautery is one of the best instruments to be used in these cases. I have been using Coley's fluid in a number of cases, and have never found the slightest sign of improvement produced by it.

Paralysis of Accommodation Due to Focal Infections.

DR. CLARENCE A. VEASEY, Spokane, read the paper published in full on page 858.

DISCUSSION.—Dr. H. F. Hansell, Philadelphia. A young man of thirty came to see me on account of not seeing well, and all that I was able to find wrong was myopia of a diopter and a half. I had him examined, and was told that he had diseased tonsils; and Dr. Lewis removed them. During the next six months, the myopia disappeared and vision became 6/6 without a glass and a concave glass made it worse.

Dr. Alexander Duane, New York. It has appeared to me that not the simple paralysis or paresis of accommodation, but the weakening of accommodation, accommodative asthenopia, must be frequently due to these focal infections. For a number of years, when I got a case of subnormal accommodation, I insisted on the nose being examined; because it has been my experience that this has been dependent on conditions of pressure within the nose, without, perhaps, any sinus infection. It has been surprising to see the effect that removal of that pressure would produce on the accommodative state.

It is only more recently that my attention has been called to other focal infections, particularly those of the tonsils and teeth, by one very striking case in which accommodative asthenopia occurred. The patient was a naval officer, whose refraction and motility had been gone over very carefully, and everything done in that regard. He had all sorts of tests made at the Naval Hospital without result, and went to the various specialists of New York without any benefit. The asthenopia continued, and he could not

read at all. He was put on duty at the Bath Iron Works, in connection with naval construction. While there, he went to Boston; and, remembering that I had said that he should have a most thoro examination, he went to a specialist and had his teeth examined. Incidentally, a tonsillar infection was found. The tonsils were removed; and almost immediately, his asthenopia disappeared. That is one of the most striking cases; but it has been paralleled by others, not so remarkable.

Dr. Lucien Howe, Buffalo. If such an affection can cause a paralysis of accommodation, there is no reason why it should not act in some cases to effect a spasm of accommodation.

Dr. T. B. Holloway, Philadelphia. Dr. Veasey was good enough to refer to the case notes that I sent him three or four years ago. It is hardly fair to include this case as strictly one of focal infection. The patient was admitted to the hospital for a series of operations. He developed a violent streptococcal catgut infection, so exceptions could well be taken to including this as one of focal infection. When he came under my observation he had a paresis of accommodation. It was the first time that I had seen one of such a character, and I have been watching for similar cases since that time. In discussing this case with Dr. Apple, of Lancaster, he said that a case of throat infection had come under his observation in which repeated cultures had shown nothing but the streptococcus. He sent the patient to me, and I found that she had a paresis of accommodation. This case would also come under suspicion because she had other paralyses, which are recognized as frequently accompanying a diphtheritic infection.

In testing the accommodation of what are apparently true cases of involvement of accommodation as well as of supposed hysteria or malingering, I have found that it is of great service to measure the near point with a series of lenses instead of with possibly one lens. At the next visit no regular order is used in placing these lenses before the eye. This method has been of service to me on more than one oc-

casion in distinguishing between a true paralytic and a functional condition. Doubtless many members of the Society may resort to the same test, but I do not recall having seen it mentioned.

Dr. Hiram Woods, Baltimore. Dr. Hansell's case suggests another form of possible focal irritation. The cases of Dr. Veasey are paralytic. The case of Dr. Hansell seems to be one of dynamic myopia produced by some irritation; and the disappearance of it after the discovery of the focal irritation points pretty clearly to the cause. Some years ago, Dr. Theobald, in a personal conversation, called my attention to another form of this thing. We were speaking of the class of cases in which there is a tremendous difficulty in getting a satisfactory cycloplegia. You begin with homatropin, and do not get anywhere; that is, in the subjective examination. The axis of a low grade of astigmatism will vary from 65° to 110° ; and the longer you keep the patient under examination, the more uncertain he gets, and the more annoyed you get. Then you wait, and go on with your cycloplegics, using atropin or hyoscyamin; and it is several days before you can get anything like a satisfactory agreement between the objective measures and the subjective tests.

Dr. Theobald asked whether I had looked at the child's teeth. To make a long story short, there were two or three teeth that needed attention. This was done, one being extracted; and since then, I have found, or thought that I have found, an explanation for this very troublesome class of cases—cases in which the ciliary muscle will not relax promptly and definitely. I have seen it associated most frequently with dental irritation, but I believe that it can come from other forms of focal irritation, and it is simply a different class of irritation. One is an irritative one; and the other, parietic—or, at least, inhibitory.

Dr. J. P. Worrell, Terre Haute. Some years ago, I made on a young man, twenty-eight years of age, for iridocyclitis, an evisceration, instead of an enucleation. At the time he had re-

jected a plus glass. A few weeks ago, he came saying that he had difficulty in reading. His vision for distance was 20/20 minus. He accepted a +0.25, with which the vision came up to 20/15. With plus 2, his near point was eleven inches, but for a moment. The vision receded rapidly. His teeth, nose, accessory sinuses and tonsils were all thoroly investigated, and were entirely negative, except that he had two bad teeth, which I had removed. Three weeks were allowed to elapse and no improvement was noted. The stump was removed. When two weeks had elapsed since the operation, he had vision for distance to 20/15, and he declined plus 0.25, which he had used when I first saw him. With plus 2, his near point was still in the neighborhood of eleven inches, but he maintained his vision longer.

Dr. George E. de Schweinitz, Philadelphia. It is interesting, in relation to focal infections and disturbances of accommodation, to distinguish between those appearing rapidly and those that come, after the focal infection may have long existed. The rapid ones, we are all familiar with. This was exhibited in a case in which, after eating some food stuff, the patient, after a short time, acquired paresis of accommodation. I have no doubt that the food contained an excess of sugar. It seems to me, as Rosenow has shown, that the area of focal infection is a depot in which is manufactured some sort of diffusible toxin, which passes out to certain cells with which it has an affinity. This is analogous to the physiologic action of drugs. Dr. H. C. Wood used to say that the time would come when we should speak of the histologic action of drugs. It seems to me that we must believe that, in some way from these focal infections, different irritative stimuli go out—call them diffusible toxins, if you like that somewhat vague term. Sometimes this irritative stimulus or diffusible toxin selects one place; sometimes another; and sometimes, none. Sometimes it finds its affinity in some particular nerve or cell. That is why these focal infections may last a long time and nothing happen; and then they find an

affinity, with the result of the condition described this morning.

Apparent Accommodation in the Lensless Eye.

DR. A. EDWARD DAVIS, New York, read the paper published in full, page 860.

DISCUSSION.—Dr. C. D. Wescott, Chicago. I think that Dr. Davis has said nothing about the condition of the capsule in these cases. I have one case under observation, and have had for many years, in which both lenses were involved in trauma. Traumatic cataract was finally absorbed by repeated needlings. But a hard, dense capsule remained, in which there was a vertical small oval opening. This patient required a plus ten with the correction of astigmatism for distant vision, and got 6/9. He could read Jaeger 1 comfortably without any addition. The explanation was the pin point pupil. I have had a case in which I made an extraction for cataract. The patient required plus 10. There was vision of about 20/25; and she read with perfect ease the newspaper without any addition. But in that case, the capsule was dense, with a central opening that appeared to be not more than a millimeter in diameter.

Dr. C. F. Clark, Columbus. Owing to the strictness of our Chairman, I was cut short before I had time to report one of the cases that illustrated my paper on Dislocation and Coloboma of the Lens. This is an eye with dislocation of the lens downward, coming on in a patient evidently congenitally affected, but as the result of a slight traumatism. This man with a plus 18 glass, read with perfect satisfaction, and has carried on his business for fifteen years with a plus 18 spherical and a slight correction of his corneal astigmatism; and has an excellent range of accommodation, 5/7 in one, and 5/6 in the other eye. He reads fine print. I reported this case to our State Society. Dr. Risley happened to be present at the meeting. He tried to account for it by the stenopaic opening. The patient has a very small pupil. Dr. Risley mentioned the improvement in vision produced by looking obliquely through a lens.

Dr. William Zentmayer, Philadelphia. About a year ago, before the College of Physicians of Philadelphia, I showed a girl on whom I had performed a linear extraction. She is now able to read Jaeger 1 at any distance with perfect facility. I used that case as a basis for reviewing the whole subject.

I think the statement of Donders was misinterpreted. What he meant was that accommodation, in the same sense that we usually employ this term, was not present in the eye. There are a number of explanations for the condition. Slight changes in the distance of the correcting lens from the eye, which enormously changes the focus of the lens, and many other explanations, have been given. It seems to me that the explanation of a stenopaic opening is the one that meets most of the cases.

Dr. William Tarun, Baltimore. I remember seeing recently a case of lensless eye in which the patient could read at ordinary reading distance with distance correction. He was fifty-five years of age, and had been operated on with a good visual result. He could read Jaeger 1 without any difficulty; and my colleagues thought that they had a case of accommodation in the affected eye. I said to the patient, "Open your eyes naturally." He did so; and I said "Now read." He said "I cannot see anything on the card."

There are probably several factors present in cases of this kind. Some patients have a deficient vision for distance, particularly myopes, who improve their vision by a certain squinting of the lids. There are presbyopes who can do the same thing without presbyopic correction.

Dr. J. A. White, Richmond, Va. I reported a case in 1897. The patient was a man forty-six years old. Examination showed two openings in the capsule. Two other patients were sisters of this man. Both were operated on. Both have the same ability. Both use the same lens for distance and reading. Both get 20/20. One has an opening in the capsule, but the other has a perfectly clear pupillary area; but still she has the same ability to interpret the dispersion circles. She can

read a newspaper and get 20/20 vision at a distance.

This has changed my mind about the explanation regarding the interpretation of dispersion circles.

Dr. Herbert Harlan, Baltimore. After reading the abstract of Dr. Davis' paper, I found this case in my clinic. The patient is a young woman of twenty-five years with a black pupil on one side, and a dense white one on the other. She stated that 11 years ago, when she was fourteen years old, she had the left eye operated on for cataract. I asked her what she could do with the one operated on, and she said, "It is perfectly good. I can read with it." She had 15/50 without correction. She never had had correction. She remarked that she had read all Mark Twain's books without a glass. Then I began testing, and found 4.5 diopters of hyperopia. That improved her vision to 15/30 minus 1. The pupil was fairly sharp, about 4 mm. long, and 2 mm. wide at the widest part. The other eye, she said, had never been operated on. The pupil was filled with a dense white membrane. Three days later, I pulled out this very tough membrane. She immediately smiled and said, "How do you do, Doctor? I see you perfectly, as well as with the other eye." There is no doubt that this girl had $4\frac{1}{2}$ diopters of hyperopia, and could read Jaeger No. 1, without any glass, at 8 inches.

Dr. Derrick T. Vail, Cincinnati. I should like to say something of accommodation of the lens to the lensless eye. I have had a number of patients, wearing their full standard glass, who are able to read naturally. I have told them that all they need to do is to pull the frame slightly down, and they can read; and that if they wish to see off, they can pull the lens back. I have a large percentage—fifty per cent—who are enjoying the result of near vision by accommodating the lens to the eye. They can go into a library and look for a book, and do not have to look through a special glass. All they have to do is to pull the lens slightly down on their nose. In the same way, in a picture gallery, they can focus for an intermediate distance by just giving a

slight movement to accommodate the lens to the eye. Some of these patients think that they have accommodation in the eye, but their accommodation is that of the lens to the eye.

Dr. W. E. Lambert, New York. I do not recall a case in adults in which this condition has been observed; but I do in young people, particularly in cases of congenitally dislocated lenses, and also in congenital cataracts. There is no question about these cases. I see them in greatest number in New York, and demonstrate them frequently at our clinic. The explanation of a stenopaic opening does not in all the cases explain the condition. There was in some a certain effort on the part of the patient to reduce the diffusion by the action of the lids on the cornea. It seems to me that the change may be due largely to the action of the extrinsic ocular muscles in producing a change in the axis of the globe, and possibly in the curvature of the cornea, increasing the convexity and giving the effect of an increased spherical refraction power.

Dr. Edward Jackson, Denver. To bring the discussion back towards Dr. Davis' paper, I want to mention a case that supports his view regarding the interpretation of images. Some years ago, I examined a man with about six diopters of myopia, who had the ordinary impairment of vision that

goes with myopia, and improvement of vision when I put on glasses. In the course of the examination, it came out that he was quite a rifle shot; that he had made record scores, and had been a valuable member of rifle teams, shooting without any glasses. He could not bring his vision up to anywhere near normal by any manipulation of his lids. But in a strong light, out of doors, his pupils contracted decidedly; and he had learned to interpret his diffusion images of the target where most of us would not notice there was a target. Diffusion circles are often capable of more accurate interpretation than one who had not experienced them thru a long period would suppose possible.

These cases should be spoken of, however, as cases of ability to read without accommodation. Accommodation, since the time that Donders brought out his work, has had a definite meaning. These cases are not vision with accommodation but without accommodation, by means of compensatory devices or tricks.

Dr. A. Edward Davis, New York. Regarding the capsule in these cases, there was a capsule in each case, but a single opening. It was not stenopaic. In one case, there was no astigmatism; so it could not be due to the patient's using first one meridian, and then the other.

ABSTRACTS

E. Török. Tuberculin in Diagnosis and Treatment of Eye Diseases.—*Archives of Ophthalmol.*, v. 48, p. 242.

Because there is tuberculosis somewhere in the body it does not follow that the eye condition is of the same origin. The demonstration of the tubercle bacillus is but rarely possible and the microscopic examination of excised diseased tissue is feasible only in some anterior affections. From a practical standpoint, the most important factors in making the diagnosis of a tuberculous affection of the eye are the clinical appearance of the eye and the tuberculin injections. Tuberculous affections are characterized by

their chronic course, low inflammatory symptoms, and the appearance of small nodules (tubercles) in the affected tissues. The latter are of the greatest importance, their presence being almost positive proof of a tuberculous affection.

To confirm the diagnosis the resort is made to tuberculin. The Calmette reaction is mentioned only to be condemned; the von Pirquet test has its limitations and when positive gives no clew to the location of the tuberculous focus in the body.

The subcutaneous test is the most reliable. For this Török gives $\frac{1}{2}$ mgm., 1 mgm. and 3 mgm. in children,

and 1 mgm., 3 mgm. and 5 mgm. in adults. A local or general reaction simply means a focus exists somewhere in the body. The focal reaction is the most important and is the one which indicates that the tuberculous focus is in the eye. In those cases in which a local and general reaction is observed, the diagnosis of tuberculosis cannot be positively established. In such cases in which all other causes can be excluded, it is justifiable to consider the eye condition as of probable tuberculous origin. Török gives a resumé of 100 cases diagnosed and treated as tuberculous eye affections.

One of the outstanding facts was the length of treatment necessary; in many cases lasting a number of years. Another point was that the cases, not responding to treatment generally, did not show a focal reaction. This was particularly true of exudative choroiditis. Of eight such cases with no focal reaction, 5 had dental infection and all recovered under appropriate treatment. All of the 11 periphlebitis retinae cases showed a focal reaction and all recovered under tuberculin therapy. In a number of cases of scleritis and sclerosing keratitis not responding to tuberculin treatment, improvement was obtained by subconjunctival injections of guaiacol cacodylat as recommended by Darier. It was thought worth while to further consider this agent and to investigate its healing qualities in stubborn tuberculous eye conditions. Tuberculin injections are commenced with a 1/10,000 mgm. dose and gradually increased, dependent on the condition and the reaction of the patient, to a maximum of 1 mgm. All general reactions are avoided. The frequency of the injections is regulated partly by the amount given and partly by the action of the tuberculin upon the patient, of necessity varying with the individual. As a general rule Török gives two injections a week until 1/1000 mgm. is reached; once a week up to 1/100 mgm; once in two weeks up to 1/10 mgm; and once a month up to 1 mgm. No hard and fast rules can be laid down as to the length of treatment, being again dependent on the individual. It is a matter of years, however, and not months. After apparent cure it is well

to give an injection every 3 or 4 months, for years. The following conclusions were reached:

We consider an eye condition tuberculous only when a positive focal reaction has been observed.

In cases where, for some reason or other, a positive focal reaction cannot be obtained, but the patient shows a positive general and local reaction, and every other possible cause for the eye condition is, with reasonable certainty, excluded, we consider the case of probable tuberculous origin.

For diagnostic and therapeutic purposes, tuberculin should always be used in fresh solution, not over two weeks old.

For diagnosis in eye conditions, only the subcutaneous injection is of value. It can be used in children as well as in adults with practically no danger.

Tuberculin is a valuable remedy in ophthalmic therapeutics provided it is used in very small doses, in positive tuberculous eye affections, i. e. in eye affections where a positive focal reaction was obtained. Used under these conditions, there is no danger involved.

The treatment should be started with a very small dose—1/10,000 mgm., increasing it slowly to the maximum dose that the patient can tolerate, which in no case should exceed 1 mgm. During treatment all reactions should be avoided.

Duration of treatment should be long. Relapses being frequent in those cases where treatment has been discontinued after an apparent cure following treatment of less than eight months.

Best results have been obtained in those cases where treatment was continued for several years, and in which, after the apparent cure, an injection of the maximum dose was given once every three or four months.

Tuberculin is of least value in chronic uveitis cases, with the exception of heterochromic cyclitis; while in the cases of scleritis and periphlebitis retinae the tuberculin treatment is most satisfactory.

Scleritis, deep and interstitial keratitis, and iridocyclitis are closely related to each other and have not a separate entity, but may change from

one condition to the other, a clinical observation which is borne out by the pathologic findings of Treacher Collins.

Exudative choroiditis cases are seldom of tuberculous origin, the source of infection often being the teeth.

W. F. H.

Mas Soewarno. Forms of Iris Depigmentation.—(Doctorate Thesis.)

Soewarno deals first with the different types of iris pigment in man, with the structure of the iris tissue and the pigment distribution, with the kinds of pigment as regards form, chemism and physiologic action and the relation in different race.

Numerous substances, which fluoresce, are capable of producing inflammations, which in albinotic animals exposed to light can go on to necrosis. The extraretinal ocular pigment of a very dark rabbit was sufficient protection against the light of a mercury lamp for 15 minutes, at 50 c.m. distance. An albinotic rabbit developed at that distance after 5 minutes a rather serious conjunctivitis, which required six days to cure. Greater differences occurred if a 1 per cent eosin-solution 1 c.m. was injected intravenously daily for a week or still greater if the animals were nourished with food stained with eosin for at least two weeks. In the dark "control" rabbit as well as in the albino the eosin injections produced a condition of photosensitivity. The reaction in the dark animal was limited to a slight conjunctival redness, after 15 minutes illumination at 50 c.m. which returned to normal after four days. The albino under similar circumstances developed a serious inflammation of the conjunctiva, much opacity of the cornea and hyperemia of the iris; and after the acute disturbances had subsided a cataract was discovered which had not existed before the exposure. The reaction to the illumination was still stronger in rabbits, which had been fed with colored oats. With the other acute symptoms, hemorrhages in the conjunctiva and iris (in one rabbit also in the retina) appeared. The iris color became a dirty grayish red, and the pupil narrow, so that in these animals an acute hemorrhagic iritis developed.

Tyrosinase has not been demonstrated in the higher animals. The opinion of Nettleship and Usher, which would explain the absence of pigment in albinos through the trysoinase theory, does not rest on facts. Bloch could demonstrate the presence of a ferment in the human skin, connected with pigmentation, by bringing the skin into contact for 24 hours with dioxyphenylalanin. Where pigment is present, the reagent which was in the beginning colorless becomes transformed into an insoluble melanin-like black product. This ferment Bloch calls dopaoxydase, being the ferment which dioxyphenylalanin (in short: "dopa") oxydises. No investigations of the functions of ferments in the development of ocular pigment have been made. A few experiments made with pieces of the irides of rabbits prove that the dioxyphenylalanin reacts upon the iris stroma, as upon the skin. The piece of iris should be embedded in thick (10-20%) solution of gelatin, which has been neutralized with a 10 per cent solution of Na_2CO_3 . However, sections can be improved upon, as good findings were got with the usual way of teasing. The writer accepts the theory, which explains the origin of the pigment through the action of a ferment.

In the second part Soewarno takes up the albinotic iris, heterochromia iridis, circumscribed depigmentations of the iris, glaucomatous iris depigmentation and depigmentations of the iris thru general diseases. A piece of an *albinotic iris* of a rabbit was treated according to the methods of Bloch and Ryniher with the "dopa"; and it was found that the iris stroma reacts to the reagents in the same way as to the control fluid (physiologic salt solution); that the stroma cells do not become stained thru the "dopa." It seems therefore that the cause of the albinotic iris must be found in the absence of the ferment of Bloch.

HETEROCHROMIA IRIDIS.

To verify Angelucci's statement of a direct connection between the sympathetic and iris coloration Soewarno extirpated the superior ganglion in three young rabbits, but did not see any dif-

ference in the color of the eyes after nine months.

The accepted, but partly contradictory, viewpoints regarding the pathogenesis of the unilateral, total depigmentation of the iris, and especially the question why in one case it is accompanied by complications and not in the other, lead to the study of heterochromia. From April, 1918, to December, 29 cases were examined in the Amsterdam Policlinic, partly with the help of the school physicians. The youngest patient was four years, the oldest nearly 70. Twelve of these were children of the elementary school. Among these four complications were found. Among the other 17, mostly adults, 15 had, besides iris depigmentation, some other pathologic change in the eye. The history often gave different colored eyes for the two parents.

The general condition of the patients was good, in only three cases did some indication exist for a general examination, which, however, did not demonstrate anything. In two cases the darker eye was the pathologic one. In No. 7 the cyclitis symptoms and the cataract were more pronounced in the darker eye; and in No. 29 the light eye was healthy, and the one with darker pigment showed Descemet's spots and vitreous changes. The writer accepts the idea of a double heterochromia and also a heterochromia iridis sine heterochromia.

Two types can be distinguished in the clinical appearance of the anterior surface of the iris. In the first the iris is, with the exception of the color, entirely like that of a normal similarly colored eye. The second type, which is generally considered typical, has a less moist iris surface, is less glossy, the relief is less distinct because the connective tissue bundles and bloodvessels are less prominent, in its totality it gives the impression of a very slight atrophy of the iris tissue. Of those examined, 11 belonged to the first type, the remaining 18 to the second type.

The Descemet spots retain a certain individuality in spite of their long existence. In one case the numerous precipitates could hardly be found after

cataract extraction; they must have been washed away by the aqueous.

The iris in sympathetic heterochromia belongs to the first type, altho experimentally it has not yet been proven that removal of the sympathetic influence produces disturbances in the iris pigmentation, many clinical observations point to such a connection. However, one must be careful when only one symptom is present, and one must also accept the fact that removal of the sympathetic is not always sufficient to produce heterochromia and that probably other unknown causes exist. In this direction point the numerous sympathetic paralyses not associated with iris depigmentation. Perhaps climatic influences are present.

Soewarno cannot accept Fuch's opinion of a common cause for the depigmentation and the cyclitis, as it seems improbable, that one and the same agent should cause the stroma pigment to disappear in the period of development, should remain quiescent for a long time and much later should produce a cyclitis. It seems as if the cause has been too often sought in the organism itself, while external causes have been disregarded. The results of the investigations regarding changes and injuries to the eye by light rays should help our insight into the cause of heterochromia.

In a rabbit exposed for 15 minutes to a mercury vapor lamp (distance 50 c.m.) fine dust-like opacities appeared in the posterior cortex of the lens. The pigmentation of the iris in rabbits can be influenced by the mercury vapor lamp in two ways, namely, thru low dosage which causes hyperpigmentation, especially in the peripheric zone and pupillary margin, and then longer exposure at a shorter distance, which produces depigmentation. It is found that unpigmented rabbit eyes are much more sensitive to ultraviolet rays than strongly pigmented ones.

The pigment epithelium of iris and ciliary processes can be damaged by the diffusely dispersed light rays in the lens; which may, according to van der Hoeve, produce cataract. If the light, which reaches the ciliary body along this indirect route, can menace this organ with disease, the more direct contact of light rays, which can be ex-

pected thru pigment-free irides, must be still more harmful. Perhaps the absence of pigment in the eye can produce a photosensitivity. Once the ciliary body is suffering, it will not be long before the lens also is affected. The one-sided blue eye is contrary to both blue eyes, and congenitally of lower value. But because a part of the blue eyes in heterochromia are a physiologic heredity, they are not followed by symptoms of iridocyclitis.

Circumscribed depigmentations of the iris. Axenfeld described in 1911 a depigmentation of the visible part of the retinal layer of iris. Soewarno notes its frequent coincidence with cataract. He found it also in eyes with developed incipient cataract. He considers that they are not simple blue or gray eyes, but that the gray color of these eyes must be considered as a pathologic phenomenon.

Glaucomatous iris depigmentation. The conclusion is reached there is more evidence against Koeppe's theory than in its favor, and that the pigment changes of primary glaucoma must rather be considered the consequences of the pathologic pressure. An interesting finding is a peculiar nacre-gray discoloration of the pupillary margin located exclusively in the pupillary zone. It often begins on both sides of an artificial iris coloboma in the ciliary margin, goes parallel with the coloboma towards or to the pupil. Sometimes it is found in the region of the sphincter iridis. The discolored strips have sharp limits, are often a few millimeters broad and contain much pigment dust. The normal iris relief has been destroyed thruout these strips, altho on a careful inspection remnants of vessels are often distinguished. They resemble the small circumscribed spots of variola-vitiligo, and also the discoloration of an iridodialysis.

These distinct atrophies and mother-of-pearl discolorations appear after acute glaucoma, operated or not, some weeks or months after serious attacks, and are apparently the result of something acting during the attack on the iris, or its vessels or nerves and not of the pressure itself.

Depigmentations of the iris consequent upon general diseases. Four dia-

betic patients did not show any pigment disturbances. Among 169 female and 107 male luetic patients, 29 showed more or less distinct changes in the iris, 23 being females. The phenomenon of depigmentation could be followed in its entirety in 7 persons. Often without subjective complaints or objectively observable signs, small gray, gray-white or yellow-white foci, of pin-head size appear in the anterior surface of the iris, which enlarge often eccentrically. They may coalesce, forming maplike fields, or normal iris tissue may remain between them. On the depigmented parts, their borders and around them fine pigment is often seen. The place of predilection is the ciliary zone. As a rule the white spots appear in both eyes. The bloodvessels appear as naked lines, best seen in light-brown and brown eyes. They cannot with certainty be recognized in totally gray or blue irides because of the absence of contrast. Krückmann has described this condition as leukiridia or leukopathia iridis. This syphilitic leukiridia appears between 3 months and 2 years. In the 7 patients where the entire cycle could be followed the average duration was about 5 months. Its frequency is twice as great among females as males. Light cannot be influential, as the greatest number was found among people, who are much indoors. The age of these patients was from 17 to above 40, half of the cases were between 20 and 30 years. In the great majority of cases the white spots were seen in the secondary period of syphilis. They appeared when most of the cutaneous eruptions had vanished. Never is it stated that iris roseola or even local hyperemia preceded. Among these 29 cases, in 17 a syphilitic leucoderma was found. These two conditions should be regarded as equivalent. Inflammatory symptoms are never seen in this condition, so that the treponema cannot be the direct cause. They may be caused by impoverished blood supply, the result of the general disease. It seems plausible, that the difference in sex explains the more frequent affection among women (Van Dar Kaaden).

E. E. B.

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OPTICAL ASPECTS OF PRINTING MAGAZINES FROM TYPEWRITER COPY

The strike of the printers has greatly interfered with publications, more particularly the weekly and monthly popular, trade and scientific magazines, some of which suspended publication.

The Literary Digest, one of the scores of periodicals forced to suspend typesetting by the lockout and strike in the local printers' trade, was the forerunner in a new method of printing directly from photo-tint plates from typewritten copy. This has been followed by Nugent's Weekly, a trade magazine, devoted to the manufacture of women's garments; the latter making the announcement that publication would be maintained by the same process every week until the strike is ended. The Literary Digest had all of its body matter reproduced in two columns as usual, the type reduced to about the same size as the regular type i. e. as small pica. The trade magazine used the same process of typewriting and

photography, but by the use of a special typewriter, the lines were "justified" or equalized in length, an improvement on its literary confrère.

On reading these journals, the editor has noticed a difference in the legibility or rather the ease of reading from that of ordinary typesetting or the linotype printing, which is certainly not in favor of this temporary makeshift for publication. This reason lies largely in the difficulty of instantaneous recognition of the word symbols made up of letters. It goes without saying that we do not spell our words in ordinary reading; that the whole word, i. e. all the letters are taken in at a glance and form a word picture; but the clearer the definition of each letter, the more easily is the word picture recognized.

It is only those who have had great experience in reading, and particularly in proof reading, who detect at a glance individual letters which are errors in spelling or punctuation. The easiest face of type to read has been found purely from empiric use. It is a type in which the vertical lines are more ac-

centuated than the horizontals; i. e., the ordinary modified Roman type with its many varieties. For ordinary typewriting, this form is not used; but we have a modified block letter, its horizontal constituents being of the same or about the same weight as the verticals. In the large sized type of the type writer, as well as those used for headings, advertisements, etc., this style would be readily read, but when put in a mass as in close lined typewriting, or full page, it is not so legible and when reduced in size to small pica or brevier, the eye does not recognize the unaccustomed word symbols so quickly or so easily and hence a feeling of fatigue results.

Then again the typewritten copy, if magnified will be seen not to have the clear definition of the lead type print; the result of which is a slightly blurred image which requires more of a mental as well as more of an ocular effort, not alone the retinal and cerebral perception but likewise the muscular sense: The latter is certainly more on account of the eyes having to move to and fro more in reading typewriter copy, or a reproduction, than is necessary in lead type prints.

Certainly a large economic saving, resulting in cutting out of the linotype and hand setting operators, the expensive machinery and materials, might be made by this form of book work; for the reproduction by photography by the methods of zinc etchings, et cetera, is much cheaper than hand or machinery work.

If however, clear copy in the form of type to which we are accustomed be given to the photo engraver, there is no doubt that a satisfactory, easily read page may be made, and this innovation bids to become a fair competitor to the ancient and accustomed process of bookmaking now in vogue.

H. V. W.

THE CONGRESS ON OPHTHALMOLOGY.

The Committee to plan and arrange for a World Congress of Ophthalmology has now been named and has be-

gun its work. The last three of its members were appointed at the Cleveland meeting, and a week later the joint committee held its meeting for organization in New York City. It consists of:

George E. de Schweinitz, Chairman, Philadelphia.

Luther C. Peter, Secretary, Phila.

Lucien Howe, Buffalo.

William H. Wilder, Chicago.

William H. Wilmer, Washington.

Walter B. Lancaster, Boston.

Edward Jackson, Denver.

Fred Tooke, Montreal, Canada.

Francisco M. Fernandez, Havana, Cuba.

This committee is broadly representative. Three members were named by the Section of Ophthalmology of the American Medical Association, three by the American Ophthalmological Society, and three by the American Academy of Ophthalmology and Otolaryngology. It was a happy thought to include representatives of the profession of Canada and Cuba. For a committee chosen in this way different sections of the country are fairly represented, with a concentration in Eastern cities that will facilitate getting together and prompt action. However, it will be necessary for this committee at an early date to form a representative American committee, as it will be necessary to get committees to represent the movement in other countries.

A first step toward preparation for the congress will be the selection of the time and place for holding it. But these can scarcely be fixed until the situation has been considered, and European and other confreres consulted as to their best season for attendance. Meanwhile American ophthalmologists ought to begin to prepare for the entertainment of their visitors both as scientific men and as tourists.

In the coming Congress the United States should supply a larger share of the scientific program than in any preceding gathering of the kind. Not only is the number of ophthalmologists practising in this country larger than ever before, and larger than in any other country, in many ways they are

more generally organized and in touch with one another. Their hospitals, out-patient services, and teaching facilities altho still far from adequate are better than they have been in the past. Worthy papers and well prepared speakers in discussion should be forthcoming in sufficient number to give our guests a favorable impression of American ophthalmology. This preparation for a feast of scientific observations will require the longest, the most widely distributed preparation. It ought to begin now.

So far as possible we want our visitors to get acquainted with North America. Where there are medical and ophthalmic institutions to show, these should be put in order and brought to the highest state of efficiency, by way of preparation. Where there are scenery, natural resources or curiosities of nature to be exploited the local ophthalmologists should prepare to offer every assistance to those foreign guests who may be interested in them. There is time between now and the holding of the Congress for one to acquire some speaking facility in either of the languages likely to be official in the Congress, English, French and Spanish. But the sooner we get about such preparations, the better will be the result.

E. J.

OUR SECOND YEAR.

Altho the past year has been one of especial difficulties of publication, the American Journal has come thru it without losing ground, and has made some substantial gains.

It has gained in the number of subscribers, both in the United States, and especially outside this country in all quarters of the globe. It has gained in the assistance of new collaborators and in the increased activity of some already on our list.

In a year when many of the prominent magazines of America like the

Century and Collier's have been forced to suspend; it has been issued each month, and has suffered no deterioration in paper or typography. It has been able to publish more colored plates and some of these have reached the highest standards of excellence in color reproduction. It has done this, and yet maintained its cash reserve, and met the increased cost of all materials and labor.

It comes to the new year better organized, better supported, with a better class of articles ready to fill its pages, with better command of the world's literature of ophthalmology than it has ever had before. Modifications will appear in the coming issues, which represent a better understanding of the needs of our subscribers. The Journal has been made and will be kept something that no progressive English speaking ophthalmologist can afford to do without.

INDEXES.

The various indexes, to this Journal and its year book supplement, occupy a large part of this number. As last year the indexes for the Journal are at the beginning and those for the year book supplement at the end of the issue.

In each case there is a name index and a subject index. The name index for the year book replaces the bibliography; which this year has been published from month to month for convenience in connection with the sections to which the various parts belong.

A glance over one of these indexes gives some indication of the amount of literature relating to ophthalmology; that is thus opened up to the student of any particular condition or procedure. The explanation appended to the year book is designed to help those unfamiliar with it to the method of using this as a work of reference.

BOOK NOTICES

The American Encyclopedia and Dictionary of Ophthalmology. Edited by Dr. Casey A. Wood, M.R.C., U. S. A., assisted by a large staff of collaborators. Fully illustrated, Volume XV, Chicago; Cleveland Press, 1919.

Volume XV carries the work from "Retina, Detachment of" to "Solution, Carrel-Dakin." Doubtless the editor begins to see the finish of his gigantic task; and his readers can begin to appreciate the value of a library of ophthalmology always alphabetically arranged for immediate use. Imagine for comparison any fifteen volumes of the literature of ophthalmology, or better any 12,000 pages which might well constitute 25 or 30 volumes of ordinary size. Consider the duplication such a collection would represent, the confusion, the uncertainty of where to look for anything in such a miscellaneous collection, the years that it would have to be studied before its possessor could command its resources.

In contrast with such a collection the Encyclopedia is not free from duplication, requires some familiarity with its contents before one has them at command. But how enormously better the command the reader has at the start, and how much sooner can he make available the unrivalled collection of facts relating to our specialty that it contains.

The first topic considered in this volume is one which immediately arrests the attention of the practical ophthalmologist; and it receives attention commensurate therewith. The 65 pages devoted to detachment of the retina seem to have been written by Dr. Wood. The section is opened by a sort of table of contents filling two-thirds of a page; which will be a great help to the reader who uses the volumes as a work of reference. Beginning with a historical review of the subject the article seems intended to end with a summary of treatment. But to the latter has been appended an abstract of an important article by Birch-Hirschfeld appearing during the cur-

rent year. Among the illustrations is the colored plate from the July number of this journal, illustrating both the article and the strenuous effort that has been made to bring the work up to date.

The other long articles in this number are upon Serology, 34 pages, Dynamic Skiametry, 105 pages, and Skiascopy, 57 pages. The one on Serology seems to be by the editor, and constitutes a very valuable aid to the ophthalmologist who wishes to make himself familiar with this new field in medicine.

The article on "Skiametry" by C. S. Sheard may justify its length more by its novelty to the ophthalmologist than by its permanent relative importance. In a general way it is an aspect of skiascopy that has been neglected by the oculist and exploited by the optometrist. The claims made for it have some foundation, but will not appeal very strongly to men trained in general physiology and pathology. The introduction of case details into an encyclopedia article might be adversely criticised. But it undertakes to carry over into practice the theoretic facts of relative accommodation; and on the whole may be found most profitable reading as new matter. On the other hand the article on skiascopy contains almost nothing that has not previously appeared in the literature on the subject, it is a summary of what has been previously worked out.

There are many other sections in this volume that will be of interest to the ophthalmic practitioner such as: Retina, Injuries of; Retinitis Albuminurica, Exudative, Pigmentosa, etc.; Retrobulbar Neuritis; Rupture of the Eyeball; Salvarsan; Sarcoma; School Hygiene; Siderosis; and many others. The new subscriber to the Encyclopedia will have the advantage of being sure of a completed work and of receiving it at an early date. It is now evident that this is the proper foundation for any working library of ophthalmology. E. J.

American Encyclopedia, Volume XV.

Truly a complete book is given on the retina, embracing nearly two-hun-

dred pages, the principal part written by Wood and "Injuries of" by Würdemann, of course with abstracts from many other authors.

The section on Serology probably by the editor, Casey Wood, is quite complete; that on Skiametry, Dynamic is certainly complete, and that on Skiascopy by Edward Jackson is a condensed but clear and complete exposition on the subject. Advantage has been taken to bring the subject up to date under subsidiary titles such as additional matter under sarcoma of the choroid; the main description of which is published under "Choroid-Sarcoma."

On the whole this volume keeps up the high class of its contents, and shows the controlling mind of its principal editor, Casey A. Wood. Certainly the series makes an exhaustive treatise on ophthalmology and one from which the practice and application of scientific medicine may be safely drawn.

H. V. W.

CORRESPONDENCE.

ACRIFLAVINE AS A STAIN FOR CORNEAL ULCERS

To the Editor: Considerable interest has recently been manifested in the therapeutic properties of some of the acridine dyes. Most of these derivatives have no amebicidal properties. One of them, however, known as "Acriflavine," is claimed to possess high antiseptic power. It is derived from a coal tar base. If this claim is substantiated by further investigation, its value and desirability as a stain for corneal ulcers is apparent.

In order to determine its staining power I recently had a quantity made up of two per cent strength in normal salt solution, and used it just as fluorescein is used for this purpose. A single drop on the upper part of the eyeball was allowed to flow down the ulcer, the eye kept closed for about two minutes and then the eye and conjunctival sac thoroly irrigated with warm boric solution.

The result has been uniformly satisfactory in the few cases in which I

have been able to try it. The stain is a bright emerald green. Its freedom from toxic properties, and the absence of any irritation to the cornea or conjunctival membrane, would make it appear that in this preparation we have a valuable addition for our use in ocular therapeutics.

Proflavine is a substance having similar properties, but its antiseptic power is not as great as that of Acriflavine.

CHAS. P. SMALL.

INVERSE ASTIGMATISM AND ASTHENOPIA.

To the Editor: Under the caption, "Observations on Astigmatism" by John Green, Jr., and William F. Hardy (January issue of the "Journal," page 64) I note the following:

"One of the reasons for the greater degree of asthenopia in eyes with inverse astigmatism is the greater interference with the legibility of ordinary printed type. In direct astigmatism the vertical components of letters are distinct, whereas the opposite is the case in inverse astigmatism. Letters with vertical components distinct are more easily recognized than those with horizontal components distinct."

As the authors base many of their conclusions upon the above statements, it is obvious that if their premises are incorrect their views require substantial revision.

Is it true that in all instances, or even in the majority of cases, of direct astigmatism, the vertical components of letters are distinct? When one recalls the physiologic optics of the principal dioptric meridians of the eye, namely, that the vertical meridian is used for seeing the horizontal aspect of the object looked at, while the horizontal meridian deals with the vertical aspect of the object, it is evident that if the horizontal meridian is at fault (as obtains in direct hyperopic astigmatism) the vertical components of the object are less distinct than any other part of it and, consequently, less clearly perceived; while in reverse hyperopic astigmatism (where the vertical meridian is subnormal) the vertical parts of the

object are more easily seen than the horizontal parts and consequently the object is more readily recognized, the very reverse of what the authors assert. One can quickly convince himself of this by simply placing before one eye (the other being closed) a minus two cylinder axis 90 degrees, which renders his refraction that of direct hyperopic astigmatism; and he will observe that under these circumstances, when, looking at Snellen's test type for distance, or Jaeger's for near, his vision is much more impaired than if the same glass is put before his eye axis 180 degrees (which makes the eye inversely astigmatic). The author's reasoning is sound when the case is one of myopic astigmatism, but when applied to hyperopic astigmatism, it runs counter to well known principles of physiologic optics.

JOHN H. BAILEY.

Brooklyn, N. Y.

[The meridian seen most distinctly will depend on the exertion or relaxation of the accommodation. It would be worth while to observe and record the actual facts regarding these cases, to ascertain when inverse astigmatism does cause greater asthenopia, and when it does not.—Ed.]

NATURAL HISTORY OF CATARACT.

To the Editor: The undersigned would like to announce that 1,200 return postal cards, like the following, have been sent out.

"I am preparing a paper on the Natural History of Cataract. I hope to show what per cent of untreated lens opacities disappear, remain stationary or increase. Should a sufficient number submit data such a table would be useful in determining by comparison the value of different therapeutic measures. If your reply shows that you have any available statistics, which you are willing to contribute, a more detailed questionnaire will be submitted.

Reply Card.

"Do you always treat incipient cataract?"

"Have you records of any number of untreated cases?"

"Do you make sketch of opacity as well as test vision?"

"Are you willing to co-operate?"

Anyone who failed to receive one of these postal cards, and wishes to co-operate, please send his name and address to Hotel Westminster.

DR. DAVID W. WELLS.

Boston, Mass.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C. Volunteers are needed in other localities.

DEATHS.

Clinton Brotemarkle, Salisbury, Md., aged 59, died in a sanatorium in Philadelphia, about October 23rd.

Stephen O. Richey, Washington, D. C., aged 70, a member of the American Ophthalmological Society, died at his home, October 8th, from cerebral hemorrhage.

James F. Smith, New York City, aged 62, died at his home October 18th, from pneumonia. He was assistant surgeon of the eye

department of the Manhattan and a member of the staff of the Post-Graduate Nose and Throat Hospital.

Charles F. Sterling, Warrenton, Virginia, aged 73, once professor of the eye and ear, University of Michigan, died October 28th from cerebral hemorrhage.

Francis Valk, of New York City, aged 74, died in St. Luke's Hospital, November 5th. Dr. Valk was a noted author and teacher, for many years Professor of Ophthalmology in the New York Post-Graduate School.

PERSONALS.

Drs. Cyril Barnert and David Newman, of New York City, have returned from service.

Dr. William M. Bane and Miss Elisebeth N. Evans, both of Denver, were married on the evening of October 8th.

Dr. Frank R. Spencer, of Boulder, was elected president of the Colorado State Medical Society at its last annual meeting.

Dr. A. C. Bartholomew announces his return to civil practice with offices in the Home Guards Temple, Van Wert, Ohio.

Mr. and Mrs. Henry Sahlein, of San Francisco, announce the marriage of their daughter, Rose Winifred, to Dr. Louis D. Green, of San Francisco, on October thirtieth.

Dr. Edward Jackson, of Denver, after forty years of active practice in ophthalmology, announces that hereafter he will confine his practice to consultation and diagnosis, including measurement of ametropia.

At a recent meeting of the Board of Regents of the University of Minnesota, Dr. William R. Murray, of Minneapolis, was appointed professor and chief of the department of Ophthalmology and Oto-Laryngology to fill the vacancy created by the death of Dr. Frank C. Todd.

Dr. William A. Sedwick, of Denver, went into the service October 11, 1917, as a lieutenant, and was discharged October 3, 1919, as a captain. During this time he served at Oglethorpe, Camp Grant, U. S. General Hospital No. 12, Baltimore, and Fort Thomas, Kentucky.

Dr. L. G. Dunlap has recently been released from the service after twelve months' service as chief of eye, ear, nose and throat, at the U. S. Army General Hospital, No. 25, Fort Benjamin Harrison, Indiana. He has now located at Anaconda, Montana.

Dr. Ralph A. Fenton, late Senior Consultant in Ophthalmology with the American Army of Occupation, and during active operations, ophthalmic surgeon with Evacuation Hospital No. 1, Toul sector, reviewed the special service of the American front and the Army of Occupation before the Portland Oto-Ophthalmological Society on October 20th.

Dr. Howard Ford Hansell has resigned his position as Ophthalmic Surgeon to the Philadelphia General Hospital, after a continuous and valued service of over twenty years. Dr. Hansell will continue his work as Professor of Ophthalmology at Jefferson Medical College.

Dr. C. E. G. Shannon has been appointed visiting Ophthalmic Surgeon to the Philadelphia General Hospital, to fill the vacancy on the staff caused by Dr. Hansell's resignation. Dr. Shannon has been associated with Dr. Hansell's services for some years, both at the Jefferson Medical College and the Philadelphia General Hospital.

Dr. Samuel D. Risley, of Philadelphia, will address, by invitation, the Buffalo Ophthalmic

Club on the afternoon of November 19th, upon the subject "Asthenopia—a Problem of Binocular Vision," and on the eve of the same day he will address the Academy of Medicine of Buffalo upon "Disease of the Uveal Tract and its Relation to Systemic Affections." During Dr. Risley's stay in Buffalo he will be the guest of Dr. F. Park Lewis.

SOCIETIES.

The meetings of the Société d'Ophthalmologie de Paris, November 16th, was the thirtieth anniversary of its foundation. Discussion of a paper on "Circulation in the Retina in Health and Disease" was opened by Dr. Bailliart.

Dr. Harry S. Gradle, of Chicago, gave a talk before the Minnesota Academy of Ophthalmology and Oto-Laryngology, on the "Indications for Operative Treatment of the Various Types of Glaucoma," and Dr. E. J. Brown exhibited his new tonometer.

The Minnesota Academy of Ophthalmology and Oto-Laryngology, held its annual meeting at the Town and Country Club, St. Paul, October tenth, and elected the following officers: Dr. J. S. White, president; Dr. J. S. Macnie, vice president, and Dr. John Morse, secretary.

On November 17th, in the Section on Ophthalmology of the New York Academy of Medicine, Dr. H. H. Janeway, presented a paper on "The Therapeutic use of Radium in Ophthalmology," based on his experience at the Memorial Hospital. Dr. J. H. Claiborne presented a paper on "Retinal Hemorrhage from Intestinal Intoxication with Complete Recovery."

The October reception of the Philadelphia Medical Club, was held at the Bellevue Stratford Hotel, on the evening of the 17th. The guest of honor was the Hon. William C. Sproul, Governor of Pennsylvania. Addresses were made by Governor Sproul, William I. Schaffer, Attorney General of Pennsylvania, and Hon. J. Hampton Moore, Mayor of Philadelphia. The reception was preceded by a dinner at the Union League in honor of Governor Sproul by the President of the Club, G. Oram Ring.

At the twenty-fourth annual meeting of the American Academy of Ophthalmology and Oto-Laryngology held in Cleveland, Ohio, October 16, 17, 18, 1919, the following officers were elected for the year 1920: President, Dr. Lee Masten Francis, Buffalo, N. Y.; First Vice-President, Dr. Hal Foster, Kansas City, Mo.; Second Vice-President, Dr. William E. Bruner, Cleveland, Ohio; Third Vice-President, Dr. Robert E. Lynch, New Orleans, La.; Treasurer, Dr. Secord H. Large, Cleveland, Ohio; Secretary, Dr. Luther C. Peter, Philadelphia, Pa.; Editor of Transactions, Dr. Clarence Loeb, Chicago, Ill.; Members of the Council, Dr. W. P. Wherry, Omaha, Neb., Dr. H. S. Gradle, Chicago, Ill.; Necrologist, Dr. Joseph C. Beck, Chicago, Ill.; Committee on Exhibits, Dr. Joseph Lichtenberg, Kansas City, Mo.

OPHTHALMIC LITERATURE

These lists contain the titles of all papers bearing on Ophthalmology received within the preceding month. These titles are all in English, some of them modified to indicate more clearly their subjects. These subjects are grouped under appropriate heads, the succession of groups being the same from month to month. In the group the papers are arranged alphabetically usually by the name of the author in heavy-face type. After the subject of the paper (Ill.) indicates the number of illustrations. (Pl.) the number of plates, and (Col. pl.) colored plates illustrating the article. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that a discussion of the subject is published with it. Under Repeated Titles are indicated additional publication of papers already noticed. To secure the earliest possible notice writers may send copies of their papers, or reprints, to 1818 Majestic Bldg., Denver, Colorado.

DIAGNOSIS.

- Darier, A.** Recent Progress in Ophthalmoscopy. (Bibl., 3 ill.) Clin. Ophth., 23, pp. 497-514.
- Hartridge, G.** The Ophthalmoscope. London, 6th Edition, 12 mo., 160 pages, 6 ill., 4 pl., Philadelphia, P. Blakiston's Sons and Co., Amer. Jour. Ophth., v. 2, p. 678.
- Howard, H. J.** Test for the Judgment of Distance. (Dis.) Amer. Jour. Ophth., v. 2, p. 755.
- Lancaster, W. B.** Research Work of the Air Service. Amer. Jour. Ophth., v. 2, p. 755.
- Snellen, H.** Visual Acuity as Measure of Function of the Retina. (Dis.) Amer. Jour. Ophth., v. 2, pp. 750-751.
- Standards of Vision.** Brit. Jour. Ophth., v. 3, p. 510.
- Weve, H.** Instrument for Examination of Hemianopic Pupillary Reaction, to be Attached to a Corneal Microscope. Amer. Jour. Ophth., v. 2, p. 749.
- Wilmer, W. H.** Vision of Aviators. Amer. Jour. Ophth., v. 2, pp. 753-755 and 758.

THERAPEUTICS.

- Carreras, B.** Injections of Milk in Ocular Affections. Los Prog. de la Clin., v. 7, p. 71.
- Harris, S. J.** Electrotherapy in Ophthalmology. Amer. Jour. Electrotherap. and Radiol., 38 p. 247.
- Nakamura and Myake.** Action of Adrenalin on the Retina. Nippon Gank. Zasshi, Feb., 1919.
- Nakamura and Mukai.** Comparison of Action of Iodin on Rabbits' and Human Eyes. Nippon Gank. Zasshi, Feb., 1919.
- Netto, O. C.** Caution Necessary with Thermal Mineral Waters in Treatment of Disease of the Eyes. Arch. Bras. de Med., v. 9, p. 504.

OPERATIONS.

- Onishi.** New Surgical Mask. (4 ill.) Nippon Gank. Zasshi, January, 1919.

REFRACTION.

- Brown, H. H.** Heredity in Myopia. Ill. Med. Jour., v. 36, pp. 230-233.
- Cheatham, T. A.** Psychology of Asthenopia. Southern Med. Jour., v. 12, pp. 626-629.
- Eye Strain and Cinemas.** Lancet, Oct. 25, 1919, pp. 744-745.
- Jackson, F. D.** Cross-cylinder in Testing Astigmatism. Optic. Jour. and Rev., 43, p. 1051.

- Loomis, E. A.** Refractive Needs in Children. Minn. Med., v. 2, p. 435.
- March, C. A.** High Myopic Astigmatism. Amer. Jour. Ophth., v. 2, p. 817.
- Marquez.** Mechanism of Skiascopy. (20 ill.) Arch. de Oftal. Hispano-Amer., v. 19, pp. 525-597.
- Rönne, H.** Determination of Astigmatism in High Degrees of Ametropia. Hospitalstidende 62, p. 933.
- Transitory Condition of Refraction.** Hospitalstidende, 62, p. 933.
- Sakai.** Berlin's Opacity and Traumatic Myopia. Nippon Gank. Zasshi, February, 1919.
- Shibuya.** Lowered Visual Acuity in Low Hyperopia. Nippon Gank. Zasshi, April, 1919.
- Wilson, J. A.** School Myopia. Brit. Med. Jour., Oct. 18, p. 512. 1919.

OCULAR MOVEMENTS

- Dolman, P.** The Maddox Rod Screen Test. Amer. Jour. Ophth., v. 2, pp. 757-758.
- Hill, E. G.** Distortion of Stereoscopic Images. Arch. of Radiol. and Electro., v. 24, p. 112. Abst., Jour. Amer. Med. Assn., v. 73, p. 1472.
- Hayden, A. A.** Vestibular Rotation Reactions and Examinations of Aviators in Signal Corps of U. S. A. (ill.) Ann. Otal. Rhinol. and Laryngol., v. 28, pp. 518-554.
- Kashiwai.** Congenital Defect of Ocular Muscles. (5 ill.) Nippon Gank. Zasshi, June, 1919.
- Mazumoto.** Ocular Muscles in Basedow's Disease. Nippon Gank. Zasshi, March, 1919.
- Pulleine, R.** Three cases of Ophthalmoplegia. Med. Jour. Australia, Sept., 1919, p. 217.

CONJUNCTIVA

- Ascher.** Results of Examination of Trachomatous Cases. Wien. med. Woch., 1918, No. 1, Clin. Ophth., v. 23, p. 554.
- Bowman, N. H.** Diagnosis and Treatment of Conjunctivitis. Texas State Jour. Med., v. 15, p. 216.
- Capps, C. M.** Differential Diagnosis of Follicular Conjunctivitis and Trachoma. Jour. Tenn. State Med. Assn., v. 12, p. 208.
- Goto.** Tuberculosis of Conjunctiva. Nippon Gank. Zasshi, February, 1919.
- Ito and Sukai.** Streptococci in Normal Conjunctiva. Nippon Gank. Zasshi, January, 1919.

- Harry, P. A. Treatment of Ophthalmia Neonatorum. *Med. Times*, v. 47, p. 87.
- Jouveau-Dubreuil, H. Trachoma in Setchouen (China). *Bull. Soc. Path. Exot.*, v. 11, p. 815.
- McClanahan, F. C. Use of Mercuric Cyanid Solution Subconjunctivally. *Jour. Amer. Med. Assn.*, v. 73, p. 1630.
- Mine. Plasmoma of the Conjunctiva. *Nippon Gank. Zasshi*, January, 1919.
- Nakamura and Mazumoto. Death from Hemorrhage of Conjunctiva in Newborn. *Nippon Gank. Zasshi*, April, 1919.
- Nishioka. Parinaud's Conjunctivitis. *Nippon Gank. Zasshi*, March, 1919.
- Sakaguchi. Inoculation of Trachoma Virus in Apes. *Nippon Gank. Zasshi*, February, 1919.
- Scott, George D. Adenoids, Chronic Conjunctivitis, Photophobia. *New York State Journal of Medicine*, v. 19, pp. 374-377.
- Repeated Titles. *Derby*. (v. 2, p. 710.) *Amer. Jour. Ophth.*, v. 2, p. 767. *MacCallan*. (v. 2, p. 736.) *Brit. Jour. Ophth.*, v. 3, p. 498.

CORNEA AND SCLERA

- Perrin, R. Keratitis due to Melinite. *Clin. Opt.*, v. 23, p. 525.
- Verhoeff, F. H. Keratitis Profunda (or Disciformis) with Microscopic Examination. (Dis.) *Amer. Jour. Ophth.*, v. 2, pp. 759-760.
- Wessely. Corneal Disturbances Caused by Cold. *Arch. f. Augenh.*, 1917-1918, v. 83, pp. 1-11. (2 pl.)

ANTERIOR CHAMBER AND PUPIL

- Espiño, J. M. Abnormal Reflexes of Pupil. *Los. Prog. de la Clin.*, v. 7, p. 51.

IRIDIAL TRACT

- Bancroft, W. D. Colors of Colloids (Blue Eyes). *Jour. Phys. Chem.*, v. 23, p. 356.
- Betti, L. Colon Bacillus Infection of the Eye. *Rif. Med.*, v. 35, p. 784. *Abst., Jour. Amer. Med. Assn.*, v. 73, p. 1478.
- Color of the Iris During Infancy. *Jour. Amer. Med. Assn.*, v. 73, p. 1445.
- Jamamoto. Cyst of the Iris. *Nippon Gank. Zasshi*, March, 1919.
- Okamura. Cases of Pupillary Membrane. *Nippon Gank. Zasshi*, March, 1919.
- Snellen, H. Traumatic Aniridia. *Amer. Jour. Ophth.*, v. 2, p. 747.
- Choroidal Tuberculosis. *Amer. Jour. Ophth.*, v. 2, p. 747.
- Waardenburg, J. P. Heterochromia and Melanosis. (Dis.) *Amer. Jour. Ophth.*, v. 2, p. 747-749.

SYMPATHETIC DISEASE

- Nowaga. Sympathetic Ophthalmia. *Nippon Gank. Zasshi*, February, 1919.
- Gifford, H. Priority in the Literature of Sympathetic Ophthalmia. *Amer. Jour. Ophth.*, v. 2, p. 766.

GLAUCOMA

- Barkan, H. Angioneurotic Edema and Glaucoma. *Amer. Jour. Ophth.*, v. 2, p. 800.

- Kothary, P. T. Glaucoma. *Indian Medical Gazette*, October, 1919, v. 54, p. 396.
- Terson, A. Late Results after Equatorial Sclerotomy in Glaucoma. *Ann. d'Ocul.*, v. 156, p. 528-537.
- Woodruff, H. W. Glaucoma. *Illinois Med. Jour.*, v. 36, pp. 228-230.
- Veasey, C. A. Ophthalmic Zoster, Retrobulbar Neuritis, Acute Glaucoma. (Dis.) *Amer. Jour. Ophth.*, v. 2, pp. 760, 763.

CRYSTALLINE LENS

- Barraquer, I. Criticism of Modern Methods of Cataract Extraction. *España Oftal.*, September, 1919, p. 265.
- Fleischer, B. Myotonic Dystrophy and Cataract. Graefe's *Arch. f. Ophth.*, v. 96, parts 1 and 2. *Brit. Jour. Ophth.*, v. 3, p. 514.
- Hess, C. Senile Cataract. *Arch. f. Augenh.*, v. 1917-18, 83, pp. 41-61.
- Hoeve, van der. Senile Macular Changes and Senile Lens Opacities. (Dis.) *Amer. Jour. Ophth.*, v. 2, p. 749.
- Kamai. Cataract from Electric Current. (5 ill.) *Nippon Gank. Zasshi*, June, 1919.
- Komoto. Cocain Anesthesia in Dissection of Cataract. *Nippon Gank. Zasshi*, February, 1919.
- Kümmell, R. Relation of Blood Serum to Lenticular Albumin in Diabetic Cataract. *Arch. f. Augenh.*, v. 17, p. 559.
- Okamura. Punctate Cataract. *Nippon Gank. Zasshi*, April, 1919.
- Torland, A. New Method in Cataract Operations. *Jour. Lancet*, v. 39, pp. 589-590.
- White, E. W., and Butler, T. H. Suppuration after Cataract Extraction Successfully Treated. *Brit. Jour. Ophth.*, v. 3, p. 496.
- Wing, P. B. Congenital Aphakia. *Amer. Jour. Ophth.*, v. 2, p. 818.

VITREOUS

- Ichima. Entrance of Bacilli into Vitreous thru Trauma. *Nippon Gank. Zasshi*, June, 1919.
- Köllner. Visibility of Hyaloid in Vitreous. *Arch. f. Augenh.*, v. 83, 1917-18, 12, 1 pl.

RETINA

- Ashikaga. Idiopathic Hemeralopia and Oguchi's Disease. *Nippon Gank. Zasshi*, January, 1919.
- Bohemier, P. S. Retinal Hemorrhage, *Union Med. du Canada*, 48, p. 178.
- Cobb, P. W. Dark Adaptation. *Amer. Jour. Ophth.*, v. 2, p. 758.
- Masuda. Ophthalmoscopy of Background of Syphilitic Eye. *Nippon Gank. Zasshi*, March, 1919.
- Maxey, E. E. Hole at Macula. *Amer. Jour. Ophth.*, v. 2, p. 792.
- Middleton, A. B. Macular Hole in Retina. *Amer. Jour. Ophth.*, v. 2, p. 779.
- Okamura. Hemeralopia in the New-born. *Nippon Gank. Zasshi*, May, 1919.
- Taylor, I. Retinal Detachment of Doubtful Origin. (2 ill.) *Practitioner*, v. 103, p. 310.

- Veasey, C. A.** Retinal Embolism. *Amer. Jour. Ophth.*, v. 2, p. 817.
Wada. Retinitis Circinata. *Nippon Gank. Zasshi*, April, 1919.
 Repeated Titles. *Urra.* (v. 2, p. 775.) *Jour. Amer. Med. Assn.*, v. 73, p. 1400.

OPTIC NERVE

- Bollack, J.** Papillary Stasis and Dilatation in Ventricles of Heart in Cerebral Tumor. (Bibl., 10 ill.) *Ann. d'Ocul.*, v. 156, pp. 538-570.
Fusisima. Coloboma of Optic Nerve. (2 col. pl.) *Nippon Gank. Zasshi*, May, 1919.
Garcia del Mazo, J. Optic Neuritis with Atrophy, Consecutive to Sudden Suppression of Menses after Emotional Shock. *Rev. de Med. y Cirurg. Pract.*, v. 123, p. 426.
Igersheimer, J. Pathology of Optic Nerve. *Graefe's Arch. f. Ophth.*, v. 96, parts 1-2. *Clin. Opt.*, v. 23, p. 553.
Jano. Optic Neuritis and Myelitis from Influenza. *Nippon Gank. Zasshi*, June, 1919.
Komoto. Parapapillary Choroidal Atrophy. *Nippon Gank. Zasshi*, January, 1919.
Snellen, H. Optic Neuritis. (Pseudo-Neuritis.) *Amer. Jour. Ophth.*, v. 2, p. 747.

VISUAL TRACTS AND CENTERS

- Beach, S. J.** A Scoop Perimeter. *Amer. Jour. Ophth.*, v. 2, p. 796.
Burdon, R. S. Binocular Vision and Roentgenography. *Arch. of Rad. and Electrotherap.*, v. 24, p. 101. *Abst.*, *Jour. Amer. Med. Assn.*, v. 73, p. 1472.
Holmes, G. Disturbances of Visual Space Perception. *Brit. Med. Jour.*, Aug. 23, 1919, p. 230.
Hurst, A. F. Hysteria. *Lancet* Nov. 1, 1919, pp. 771-775.
Kikita. Fields of Vision and their Limitations. *Nippon Gank. Zasshi*, May and June, 1919.
Lutz, A. Eye Symptoms in Pseudo-tumor Cerebri. *Arch. of Neurol and Psychiat.*, November, 1919, p. 539.
Pagenstecher, A. H. Scintillating Scotoma. *Arch. f. Augenh.*, 1917-18, 83, p. 14-33.
Stephenson, S. Eye Symptoms as the Only Indication of Fractured Base of the Skull. (Bibl.) *Brit. Jour. Ophth.*, v. 3, pp. 505-509.
Zeeman, W. P. C. Struggle of the Visual Fields (with demonstration). *Amer. Jour. Ophth.*, v. 2, p. 752.
 Repeated Titles. *Best.* (v. 1, p. 751.) *Brit. Jour. Ophth.*, v. 3, p. 521.

EYEBALL

- Samperi.** Metastatic Ophthalmia in Influenza. *Glor. di Med. Mil. Rome*, v. 67, p. 597.
Itoh. Metastatic Panophthalmitis from Typhus Bacilli. *Nippon Gank. Zasshi*, June, 1919.

THE LACRIMAL APPARATUS

- Wada.** Specific Gravity and Physical and Chemical Character of the Tears. *Nippon Gank. Zasshi*, May and June, 1919.

LIDS

- Bedell, A. J.** Multiple Vaccination of Eyelids. (Dis.) *Amer. Jour. Ophth.*, v. 2, p. 759.
Bland-Sutton, J. The Third Eyelid. (6 ill.) *Lancet*, October 18, 1919. pp. 673-675.
Kalt. Restoration of Lid after Total Destruction. (2 ill.) *Ann. d'Ocul.*, v. 156, pp. 521-574 and 575.
Marin Amat, M. Marcus Gunn's Syndrome. (Bibl., 3 ill.) *Ann. d'Ocul.*, v. 156, pp. 513-528.
Schnyder, W. F. The Swallowing Reflex Elicited from the Eye. *Corresp.-bl. f. Schweizer Aertze*, v. 49, p. 1388. *Abst.*, *Jour. Amer. Med. Assn.*, v. 73, p. 1478.
Wilder, W. H. Symblepharon with Restoration of Orbital Socket. *Amer. Jour. Ophth.*, v. 2, p. 807.

ORBIT.

- Hilario de Gouvea.** Ocular Protheses. *Brazil-Med.*, v. 33, p. 341. *Abst. Jour. Amer. Med. Assn.*, v. 73, p. 1479.
 Repeated Titles. *Souques and Lermoyze.* (v. 2, p. 306.) *Jour. Amer. Med. Assn.*, v. 73, p. 798.

PARASITES

- Pacheco Luna, R.** Disturbances of Vision from Filarial Tumors. *Amer. Jour. Ophth.*, v. 2, p. 793.
 Repeated Titles. *Hoith.* (v. 2, p. 842.) *Jour. Amer. Med. Assn.*, v. 73, p. 1564.

TUMORS

- Castelain.** Tumor of Macular Region. *Soc. d'Ophth. de Paris*, July, 1919. *Ann. d'Ocul.*, v. 156, p. 576.
Coffin. Sarcoma of Orbit Removed thru Killian Incision. *Laryngoscope*, v. 28, p. 881.
Cousin. Fibroma of Orbital Cavity. *Soc. d'Ophth. de Paris*, July, 1919. *Ann. d'Ocul.*, v. 156, p. 575.
Komoto. Papilloma of Cornea. (1 col. pl., 2 ill.) *Nippon Gank. Zasshi*, May, 1919.
Kuboki. Tumor of Lacrimal Gland. *Nippon Gank. Zasshi*, April, 1919.
McBean, G. M. Choroidal Carcinoma, Bilateral Metastasis from Breast. *Jour. Amer. Inst. Homeop.*, v. 12, pp. 511-512.

INJURIES

- Aubaret.** Lesions of Lacrimal Apparatus in War Injury. *Marseilles Méd.*, v. 56, p. 145.
Buchanan, L. Unusually Extensive Rupture of the Corneo-Scleral Margin. *Brit. Jour. Ophth.*, v. 3, p. 497.
Hack, R. Indelible Pencil Wounds of the Eye. *Arch. f. Augenh.*, 1917-18, 83, pp. 34-37.
Le Pendu. Enucleation or Evisceration in Treatment of Ocular Wounds. *Clinique.* August, 1919, *Clin. Ophth.*, v. 23, p. 546.
Wheeler, J. M. War Injuries of Lids and Plastic Operations. *Amer. Jour. Ophth.*, v. 2, p. 759.

- Wiley, A. Injury to Eye. Therapeutic Gaz., v. 43, p. 759.
Repeated Titles. Igersheimer. (v. 2, p. 752.) Brit. Jour. Ophth., v. 3, p. 523.

GENERAL DISEASES

- Brose, L. D. Focal Disease Involving Antrum, Teeth, and Eye. Laryngoscope, v. 29, p. 583.
Calhoun, F. P. Ocular Complications of Typhoid Inoculation. (Dis.) Amer. Jour. Ophth., v. 2, p. 752-753.
Genoese, G. Oculocardiac Reflex in Infant. Gaz. Intern. di méd Chir., 1918. Abst., Arch. Méd. des Enfants, v. 22, p. 495.
Harkness, C. A. Luetic Affections of the Eye and Their Management. Jour. Amer. Inst. Homeop., v. 12, pp. 512-518.
Jeans. Cerebro-spinal Involvement in Hereditary Syphilis. Amer. Jour. Dis. Children, September, 1919. Abst., Amer. Jour. Med. Sc., v. 158, p. 747.
Nakamura. Relation of Blood Pressure and Eye Disease. Nippon Gank. Zasshi, January, 1919.
Piper, A. S. Syphilis of the Eye. Jour. Okla. State Med. Assoc., v. 12, p. 270.
Snellen, H. Intraocular Tuberculosis. (Dis.) Amer. Jour. Ophth., v. 2, p. 747.
Winslow, K. Epidemic Lethargic Encephalitis (nona) in Seattle. Northwest Med., 18, p. 209.

COMPARATIVE OPHTHALMOLOGY

- Howe, L. Migration of Eye in Flounders. Amer. Jour. Ophth., v. 2, p. 758.

HYGIENE

- Bahrenburg, L. P. H., and Kerr, J. W. Prevention of Blindness in Missouri. Jour. Missouri Med. Assn., v. 16, pp. 385-386.

- Beals, M. B. Sight Conservation Work in Public Schools. Bull. Dept. Health, New York, v. 9, p. 220.

- Graves, W. W. Help Prevent Blindness. Jour. Missouri State Med. Assn., v. 16, pp. 393-394.

- Prevention of Blindness in Missouri. Jour. Miss. St. Med. Assn., v. 16, p. 385.

OPHTHALMIC SOCIOLOGY

- Bahn, C. A. Ophthalmologic Paris. Amer. Jour. Ophth., v. 2, p. 804.
Blind Polish Children. New York Med. Jour., v. 110, August 16, 1919, p. 291.
Bouquet, H. Signature of the Blind. Le Mond Medical, October, 1919, p. 241.
Günther, H. Reading Machine for Blind. Bl. f. Volksgsmdhtspf., 1919, 18, pp. 112-115.
Higgins, S. G. Visual Disability from Injury and Compensation. Amer. Jour. Ophth., v. 2, p. 813.
Jess, A. Ophthalmologic Experiences in War. Samml. zwangl. Abhandl. a. d. Geb. d. Augenh., Halle a. S., 1918, 10, 1-37.
Onfray. Report of Commission on Spectacles. Soc. d'Opht. de Paris, July, 1919. Ann. d'Ocul., v. 156, p. 575.
Onichi. Making of Glasses. Nippon Gank. Zasshi, February, June, 1919.
Rasquin. Reduction in Capacity for Work after Traumatic Cataract. Clin. Ophth., 23, p. 515.
Wallace, W. Statistics of Cases Seen During Four Years in the R. A. M. C. Brit. Jour. Ophth., v. 3, pp. 481-496.
Wholey, C. C. Our Blinded Soldiers. Jour. Amer. Med. Assn., v. 73, pp. 1568-1574.
Würdemann, H. V. W. The Army Ophthalmic Surgeon. Amer. Jour. Ophth., v. 2, pp. 765-766.

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